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## REHABILITATION\*

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THE RAPID DEVELOPMENT and acceptance of rehabilitation during the past decade has resulted in a changing emphasis in medicine and medical education to the point where rehabilitation is now regarded as the third phase of medicine, ranking in importance with the other two—preventive medicine and curative medicine.

The Canadian Medical Association has recognized the importance of this development by being represented on the National Advisory Committee on Rehabilitation of Disabled Persons and by the fact that the Association has recently created a standing committee on rehabilitation. This committee, under the able chairmanship of Dr. A. T. Jousse of Toronto, made its first report to the General Council of the Canadian Medical Association in Vancouver in June 1954. In that report, certain recommendations are made which will be referred to later. It is obviously necessary that each of the Divisions set up a corresponding committee on rehabilitation.

As a profession it is not sufficient that we limit the scope of our efforts to (1) prevention of disease and the maintenance of high standards of public health, and (2) diagnosis and treatment of disease and injury when present. We must also recognize our responsibilities to fulfil our part in the restoration of the disabled person to his fullest physical, mental, social, vocational and economic usefulness. The medical profession should not only take the leading part in this rehabilitation programme, but also display the leadership that is necessary to further develop rehabilitation services.

Physical medicine and rehabilitation have manifested a very marked and rapid change over the past two decades, especially since the last war. Physical medicine was formerly apt to be

concerned with the treatment of a specific complaint rather than the patient as a whole person and employed heat, massage, and hydro- and electro-therapy on a passively receptive patient.

Now physical medicine is recognized as the medical approach to the whole broadening concept of rehabilitation and is directed towards assisting the patient along the road to physical, mental, social, vocational and economic recovery. The patient takes an active part in this programme and success is determined by the extent of his co-operation, for rehabilitation cannot be achieved in a passive recipient. Rehabilitation is not something to be resorted to when all other measures have failed, but is an active process that should commence in the general hospital as soon as the patient has recovered from the acute phase of his illness or the immediate effects of his accident.

We all know that disabilities tend to increase, both numerically and in severity, with age. When we consider that there has been a gradual increase in longevity, with an increasing number of people living to reach old age, and that the increase in life span is still continuing, the magnitude of this problem becomes very apparent. It is only a little over fifteen years ago that sulfonamide chemotherapy revolutionized our means of controlling infections. In the past ten years, antibiotics have dominated the picture. The result of both of these, along with all the other advances in diagnostic and curative methods, has been a steady improvement in our medical services. The increasing disability with age can be shown by the tabulations of the number per thousand disabled at various age levels (Table I).

In some cases of illness or injury, recovery may be complete and the patient able to return to his former or a related type of occupation; in other instances, the residual effects of the illness or accident may leave permanent partial or total disability which will require a readjustment of the disabled person's entire pattern of living. These disabled persons are entitled to the assistance of all those community facilities

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TABLE I.

Age	Number per 1,000 disabled
25.....	35
45.....	100
60.....	250
80.....	over 500

that will help to restore them to "the fullest usefulness of which they are capable." The most common disabilities encountered are orthopaedic defects, blindness, deafness, speech disorders, mental illness, epilepsy, tuberculosis and chronic heart disease. The orthopaedic conditions are made up of those resulting from poliomyelitis, arthritis and osteomyelitis, spinal cord or other injuries and congenital and neurological causes, including the results of cerebral vascular accidents.

The professional services involved in the rehabilitation of this whole group are very numerous; all the specialties of medicine may be included, as well as the fully trained specialist in physical medicine and rehabilitation. In addition there will be needed the services of clinical psychologists, physical therapists, occupational therapists, speech therapists, nurses, social workers, brace makers, limb fitters, vocational counsellors and placement officers. As many specialties and services are involved, the effectiveness of a rehabilitation programme is predicated on the teamwork approach to the problem. A team assembled in one place such as a rehabilitation centre is more efficient than one which is scattered about the community.

It is most important to remember that rehabilitation is actually a medical problem. If rehabilitation is the third phase of medicine, it is essential that the whole programme of rehabilitation be directed by the medical profession. It is equally important that the profession be prepared and equipped to provide this direction and leadership.

During World War I rehabilitation as such received scant attention on this continent, partly because man-power supply was never critically reduced, and partly because many potential rehabilitable patients such as paraplegics died from want of effective measures to control infection. Following that war, the turbulent twenties produced no great awareness of these problems, nor did the depression years in the thirties. It was during World War II that rehabilitation became a recognized need. In the armed services, interest was focused on getting

the sick or injured back on duty in the shortest possible time; whereas in civilian life a shortage of man-power made it imperative that every potential worker be salvaged and returned to industry, for this was a war of machines and the strength of a nation was measured in terms of technical skill and productive capacity.

It is to the lasting credit of that great statesman, Bernard Baruch, that he had the foresight to set up a committee of specialists in physical medicine to study this entire problem and make recommendations. The first report of the Baruch Committee appeared in 1944 and stressed the need for the establishment of community rehabilitation centres, so designed as to serve the needs of one or more hospitals as well as the community as a whole. These were retraining centres where the disabled, particularly the orthopaedically disabled, could be rehabilitated. It was soon evident that, in addition to such community rehabilitation centres, there was need for great expansion of rehabilitation services in hospitals. It was also evident that rehabilitation was not something to be started *after* the patient had left the hospital, but should be commenced while he was still in the ward. This could be accomplished by the expansion of departments of physical medicine in general hospitals, in order that they might become departments, not of physical medicine alone, but of physical medicine and rehabilitation. It is timely to point out that, all over this country, there must be a tremendous awakening to the needs for rehabilitation services.

It is unnecessary, I know, to emphasize to an audience such as this the value of such services, but it may lend emphasis to the whole problem to call your attention to some of the experiences reported on this continent. It is well known that rehabilitation is based on logic and common sense, and that the process of rehabilitation is basically an effort to make the most of what is available. As doctors we are all aware of the damaging effects of prolonged illness, especially of prolonged bed rest, and we know that this process affects the individual mentally as well as physically. In the hospitals operated by the Department of Veterans' Affairs, dependency is especially likely to occur and paternalism is a constant menace. In civilian life, the disabled individual is only too apt to be relegated to a "back room," dependent on his family, his friends, or more likely on public social assistance. To



take such dependent individuals and convert them into wage earners and taxpayers is indeed a major triumph. When employment of the disabled worker was first considered, many employers regarded him as a hazard and a non-competitive worker, but experience has shown that where the disabled man is placed in a job suited to his capabilities and interests, he is actually an asset, and as a group these workers often show less absenteeism and greater proficiency.

Many examples might be cited of what can be accomplished by a comprehensive and intensive rehabilitation programme, but one of the best has been reported by Dr. H. A. Rusk. In one institution there were 130 chronic neurological cases, veterans of World War I, some of whom had been in bed as long as ten years. After nine months of "total push", 25 left hospital and took employment, 40 left hospital for their homes, 30 were ambulatory, 25 capable of self-care, and only 10 showed no improvement. The estimated saving in this one group alone was over one million dollars. The 1952 report of the Office of Vocational Rehabilitation in the United States shows that 64,000 disabled were rehabilitated during that year. This group had been costing the taxpayer 8½ million dollars in public assistance payments and at a cost of 6 million they were restored to jobs in which it is estimated that they will pay about 10½ million in income taxes per year. These figures speak for themselves.

While these figures show the value of this programme in terms of dollars it must not be inferred that the only gain consequent on rehabilitation is the economic one. The benefit to the morale and self-respect of the disabled greatly outweighs all the economic aspects, regardless of their magnitude. To convert the disabled, dependent individual into an independent, self-supporting member of society is, in itself, a most laudable accomplishment.

Apart from other considerations, the burden of welfare cost today makes it imperative that we rehabilitate those of our aging population and younger disabled men, women and children who would benefit from re-training. Rusk has pointed out that in another twenty-five years for every able-bodied worker there will be one physically handicapped, one chronically ill and one over 65 years of age. This is the great challenge of the future.

In Vancouver this problem has been approached in two ways. The Department of Veterans' Affairs early in World War II recognized the changing status of physical medicine and the need for great expansion in rehabilitation services. The lead taken by the Department in its treatment centres across Canada has had a most salutary effect on Canada as a whole. From the civilian aspect this problem was approached by the Western Society for Rehabilitation which was organized in 1947. This Society made plans for the first civilian community rehabilitation centre, designed along the lines recommended by the Baruch Committee, to be established in Canada. Funds to build the first unit of this centre at a cost of about \$200,000 were raised entirely from private sources. The first unit of the Centre was opened in January 1949 and since then the work of this Society has shown a remarkable growth which, in itself, demonstrates the urgent need for such services. For the addition of the second unit of the Centre, the Federal and Provincial Governments made a small contribution and for the final expansion and construction of units 3 and 4, which were officially opened in March of this year, the Provincial and Federal Governments each contributed one-third of the cost and the Western Society obtained the balance from private philanthropy. Our local Rehabilitation Centre now has 53 beds and a floor area of 53,000 square feet. This area is divided as shown in Table II.

TABLE II.

Residential.....	15,200
Treatment (including speech therapy).....	19,150
Brace shop.....	2,400
Canadian Arthritis and Rheuma- tism Society.....	4,400
Cerebral palsy.....	4,450
Administration and miscellaneous..	7,400
	53,000

The Centre was planned for the use of all the orthopaedically disabled in the area and was at first devoted mainly to poliomyelitis and spinal cord injuries. The services have been extended to include cerebral palsy and the Cerebral Palsy Association of Greater Vancouver now has its headquarters and treatment services in our Centre. More recently the British Columbia Division of the Canadian Arthritis and Rheumatism Society was included and this organization now uses the Centre as the headquarters for their

medical staff, social workers and physical and occupational therapy departments.

In addition to poliomyelitis, cord injuries, cerebral palsy, and arthritis, individuals with speech disorders, cerebral vascular accidents, and amputees, particularly double amputees, are successfully treated in this Centre. A recent analysis of our present case load, not including the cerebral palsied or arthritic patients, indicated that we had 140 disabled individuals under training; 39 of these were resident, and 101 non-resident. The diagnoses in this group were as follows:

TABLE III.

Poliomyelitis.....	62%
Hemiplegia.....	13%
Spinal cord injuries.....	11%
Paraplegics	
Quadraplegics	
Amputees.....	2%
Miscellaneous balance.....	12%
including muscular dystrophy,	
multiple sclerosis, adult cerebral	
palsy.	

TABLE IV.

ADMISSION AND DISCHARGE RECORD		
Year	Admissions	Discharges
1949.....	68	28
1950.....	127	74
1951.....	125	124
1952.....	184	203
1953.....	254	212
1954 to June 30.....	172	144

As the Centre is regarded more as a school than a hospital, those attending the Centre are referred to as trainees rather than patients.

The questions might well be asked—"Where do these trainees come from, and what was done for them before?" The answer to the first question is that we now start rehabilitation at the earliest possible moment and most of our trainees come from general hospitals for acute conditions. It is unfortunately only too true that many of them who had suffered their illness or accident years ago came to us from the "back bedrooms" at home or from nursing homes for "incurable" patients. The answer to the second question is that little or nothing was done for them prior to the development of this rehabilitation programme. Referrals are also made to the Centre from social workers, other agencies, physicians in private practice and public welfare officers.

The work of this Centre is, of course, only beginning and our programme requires greater expansion. We need, for example, a full-time staff psychologist, increased vocational training facilities and better placement services. In recognition of the great need for speech therapists in Canada the Centre has set up a Department of Logopedics through which and in co-operation with the University of British Columbia the first school of speech therapy has been inaugurated in Canada.

In the five and a half years of our operation we have been beset by shortages of trained personnel. This shortage has been very evident in all these specialties and services and represents the great need facing this programme in our communities today. More people must be attracted to and trained for this field of rehabilitation. More doctors must take up the specialty of physical medicine and rehabilitation; more physiotherapists, occupational therapists, speech therapists, brace makers and limb fitters are urgently needed. In physical and occupational therapy training especially, young men should be attracted since the loss of trained women through marriage and childbearing is so great that adequate numbers of trained workers will never be secured until men are attracted to this field. It is interesting to note in passing that men are beginning to show an interest in nursing training where the same high loss of trained women occurs. It is most encouraging that in the new rehabilitation grants recently announced by the Federal Government provision will be made to assist in the training of doctors, physical therapists, occupational therapists, remedial gymnasts and others needed in this programme.

If we are to provide the rehabilitation programme required by patients recovering from illness or injury, that service must be instituted while the patient is still in hospital and *not* after discharge. The days of stay in hospital can be lessened by adequate rehabilitation measures. Take for example the patient with hemiplegia due to cerebral thrombosis. It is now known that these patients should be started on a rehabilitation programme as soon as they recover consciousness; in this way they may become capable of self-care and even ambulatory in a much shorter time and more satisfactory way. Cases formerly regarded as totally and permanently disabled can, in almost every instance, be made to show remarkable improvement. Every large



hospital should have a department of physical medicine adequately staffed to render this full rehabilitation service. This will require a substantial increase in physical therapists and physical training instructors. It is obvious that physical therapy today is directed towards the individual as a whole rather than the treatment of a symptom or a particular part of the body. Occupational therapy, which is essential to any complete rehabilitation programme, has suffered neglect in the hospitals in some areas and should be greatly expanded. Too often occupational therapy is relegated to the role of "diversional therapy" and the potentialities of this service to provide functional training and training in self-care are often overlooked.

While the smaller hospitals cannot hope to maintain a complete rehabilitation programme every hospital can and should make some provision for physical therapy. Cases requiring further rehabilitation training can be referred to larger hospitals with departments that are better equipped and staffed or to the community rehabilitation centre.

It is of interest to note the tremendous development that has occurred in the United States in this regard and to see that total expenditure of Federal and State funds for vocational rehabilitation has risen from 4 million dollars in 1940 to 10 million in 1945, 29 million in 1950 and 34 million in 1953. We can only hope for a corresponding increase in Canada. The recent establishment of a National Health Grant for Rehabilitation has made Federal funds available to the Provinces to meet these urgent needs.

The recommendations of Dr. A. T. Jousse, Chairman of the Canadian Medical Association Committee on Rehabilitation, might well be quoted here:

"Fundamental to the success of any comprehensive programme of rehabilitation is the recruiting of the appropriate skilled persons who understand the meaning and intent of the term rehabilitation. . . . Rehabilitation of the sick and disabled is a medical responsibility, and the medical profession must be educated to this point of view and trained to assume their responsibility in conjunction with the other members of the team.

"The evolution of a national medical rehabilitation programme must be integrated with the provincial plans already in operation. Through the provincial Division of the Canadian Medical Association, the doctors as a group must be informed about the facilities existing . . . both the services established and operated by the various provincial governments as well as the services provided by the voluntary agencies such as the Canadian Arthritis and Rheumatism Association, etc. . . ."

"It is recommended that under the National Health Grant Programme the funds now available be used to

establish rehabilitation demonstration units in teaching hospitals or comparable establishments. These units to consist of rehabilitation, treatment and evaluation teams comprising medical personnel, physical and occupational therapists, nurses, remedial gymnasts, rehabilitation counsellors, social workers, psychologists and others as required."

Rehabilitation is not a panacea that can be simply compressed into a hypodermic syringe and injected into the patient. It is a very extensive and complex process, involving directly or indirectly all of the medical specialties and auxiliary services. The intelligent integration of this programme with community medical services and facilities and public and voluntary agencies will not be easy. To obtain the support and participation of the three levels of Government, along with industry, labour and the public at large, will represent a difficult task. To provide the facilities and numbers of trained personnel necessary to adequately house this programme is urgent and merits our immediate consideration.

The need for these rehabilitation services is enormous, embracing the whole country and reaching into every level of our society. This is essentially a health problem and a first responsibility of the medical profession, for a person cannot be said to be truly healthy unless he is in a state of physical, mental, social and economic well-being.

This represents the challenge that confronts the medical profession today—a challenge so broad in scope that there is a part to be played by everyone.

#### RÉSUMÉ

La réhabilitation est maintenant considérée sur un pied d'égalité avec la médecine préventive et curative. Son champ d'action s'exerce dans les domaines physique, mental, social, économique et d'orientation professionnelle. Elle a pris son essor surtout depuis la dernière guerre mondiale. La réhabilitation d'un malade doit commencer aussitôt après qu'il a passé la phase aiguë de sa maladie ou de son accident. L'incapacité s'accroît avec l'âge; si l'on considère l'accroissement continu de la longévité, le champ d'action de la réhabilitation apparaîtra dans toute son ampleur. Les reliquats d'une maladie ou d'une blessure peuvent quelquefois forcer le malade à changer son genre de vie, voire son métier. Il importe donc de l'orienter correctement de manière à lui faire donner le meilleur rendement possible dans son nouveau genre d'occupation. Le travail conjoint de plusieurs spécialistes: médecins, psychologues, thérapeutes physiques, d'occupation ou de langage, infirmières, travailleuses sociales, fabricants d'appareils prothétiques, aviseurs de métiers et officiers de placement. Le travail d'équipe est évidemment nécessaire, mais la direction doit être médicale. En 1944, le rapport du comité Baruch fit valoir les besoins d'établir des centres de réhabilitation comme complément des hôpitaux, la réhabilitation étant confiée au département de médecine physique des grands hôpitaux. Au début, les employeurs

considéraient avec méfiance les produits de ces centres de réhabilitation, et hésitaient à engager un travailleur infirme, de crainte qu'il ne soit pas à la hauteur de son emploi. Depuis, l'expérience a montré que le travailleur infirme à qui on confie un emploi en rapport avec ses capacités et ses intérêts sait se tirer d'affaire aussi bien sinon mieux que ses compagnons normaux. Même si la réhabilitation ne servait à autre chose qu'à éviter le séjour prolongé de plusieurs malades dans des hospices ou institutions équivalentes, elle permettrait l'économie de milliers de dollars au pays. Dès le début de la deuxième grande guerre mondiale, le Département des Affaires des Vétérans a pris l'initiative d'établir des services de réhabilitation dans des centres de traitement à travers le pays. Un équivalent pour la popula-

tion civile de l'Ouest du pays fut créé en 1947 par la Western Society for Rehabilitation. Au début, cette société s'occupa surtout des infirmes de la poliomyélite et des traumatisés de la moelle épinière. Ses services s'étendent maintenant aux malades souffrant de paralysie cérébrale et des diverses formes d'arthrite et de rhumatisme. La difficulté la plus sérieuse rencontrée dans l'organisation de centres de ce genre réside dans le manque de personnel entraîné. Un plus grand nombre de médecins devraient se consacrer à la médecine physique. Il devrait en être de même dans les autres domaines spécialisés de réhabilitation. Les nouveaux octrois de réhabilitation récemment accordés par le gouvernement fédéral permettent d'espérer la formation d'un personnel suffisamment entraîné. M.R.D.

## ALCOHOLISM\*

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A FEW YEARS AGO the World Health Organization established an Expert Committee on Mental Health, and the reports on the first three sessions of the latter body contain a wealth of penetrating observations and far-sighted recommendations.<sup>1, 2, 3</sup> Amongst the visible evidence that has hitherto appeared of progress in the implementation of their educational programme may be mentioned the publication by the World Health Organization of three important monographs: "Psychiatric Aspects of Juvenile Delinquency",<sup>4</sup> "Maternal Care and Mental Health"<sup>5</sup> and the ethno-psychiatric study entitled "The African Mind in Health and Disease."<sup>6</sup>

The early recognition of alcoholism as a major challenge in the promotion of mental health is indicated by the fact that at its first session in 1949 the Expert Committee on Mental Health advocated the setting up of a sub-committee to consider this problem. The Alcoholism Sub-Committee met for the first time in Geneva in December 1950,<sup>7</sup> at which time they were concerned mainly with general and theoretical considerations, and met again in Copenhagen in October 1951,<sup>8</sup> when they concentrated more on the organization of rehabilitation facilities for alcoholics. During the two weeks immediately following the second session of this sub-committee of experts, there was held in Copenhagen a European seminar and lecture course on alcoholism sponsored by the World Health Organization.<sup>9</sup> The present article is based largely on the review of the proceedings of the latter gathering compiled by Jellinek.† The major divisions of the subject matter are essentially

the same as in the latter review, but the subdivisions have been substantially revised, and a certain proportion of the material in the present article has been derived from other sources.

### A. PHYSIOLOGICAL ASPECTS OF THE USE OF ALCOHOL

The metabolism of alcohol and its effects on the organism are considered first as their discussion develops concepts relevant to the subsequent consideration of the etiology and treatment of alcoholism.

#### 1. METABOLISM

Lundsgaard<sup>10</sup> considered four special features in the metabolism of alcohol. (a) Ordinary foods have to undergo digestion in the intestinal tract before absorption, but alcohol is absorbed directly from the intestinal tract and for this reason is absorbed quickly. (b) Alcohol spreads freely and quickly in the entire water content of the body. (c) The rate of alcohol oxidization is independent of the alcohol concentration in the organism. (d) The rate of alcohol oxidization is independent of muscular activity.

From the above observations, it may be concluded that there is a progressive rise in the blood alcohol concentration during the period in which the rate of absorption exceeds that of oxidization. Moreover, while as much as 70% of the total *resting* metabolism may be covered by the combustion of alcohol, the rate of the latter does not change and will cover only a small proportion of the total metabolism when this has been increased by muscular exercise. The finding that the rate of alcohol oxidization is independent of muscular activity is due to the fact that the only organ in which alcohol is

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‡This document is not for sale, but a limited number of copies are available on request from the Regional Office for Europe of the World Health Organization, for distribution to libraries and health institutions.



directly oxidized is the liver. However, the acetic acid formed from alcohol in the liver is transmitted in the blood to all other tissues and there further oxidized to carbon dioxide and water.

## 2. ACUTE EFFECTS OF ALCOHOL ON THE CENTRAL NERVOUS SYSTEM

Jellinek<sup>11</sup> remarks that:

"The evidence of the sum total of psychological experiments with small amounts of alcohol is that all psychological functions show a decrease in degree. . . . The designation of alcohol as a stimulant is incompatible with these findings, which are rather the characteristics of a cortical depressant."

However, unless the symptoms are obtrusive, only objective laboratory tests can show whether or not a person is affected to some degree by alcohol.

The degree of impairment of any given psychological function increases as the level of the blood alcohol concentration rises but this relationship is logarithmic rather than rectilinear, and a small increase in the blood alcohol may result in a proportionately much larger increase in the degree of impairment. However, the same blood alcohol concentration does not bring about an identical impairment of function in all persons. These differences in the degree of impairment depend largely on the amount of alcohol to which the drinker has been accustomed. The factors governing the alcohol concentration in the blood, and individual tolerance to alcohol, will now be considered.

(a) *The alcohol concentration in the blood* is determined largely by two factors: (1) *The weight factor*. The blood alcohol concentration bears an inverse relationship to the weight of the individual. (2) *The absorption factor*. The concentration of alcohol in the blood at any given time is dependent to some extent on its rate of absorption. This, in turn, is dependent on several factors, the most important of which are the amount of food in the stomach, the state of the alimentary mucosa, and the degree of the dilution of alcohol in the beverage consumed.

(b) *Individual tolerance to alcohol*. Tolerance is often thought of mistakenly in terms of the effects of the amount of alcohol consumed, rather than the effects of a given blood alcohol concentration. An apparently high tolerance may thus be observed in heavy individuals, or persons drinking on a full stomach (*vide supra*). How-

ever, there is also a variation in the true tolerance of different individuals to the same concentration of alcohol in the blood, and Jellinek points out that "While users of alcoholic beverages generally acquire psychologically or physiologically increasing tolerance to alcohol it has been observed that alcohol addicts suffer a loss of tolerance in the late chronic phase of their alcoholism."

## 3. THE EFFECT OF PROLONGED LARGE ALCOHOL INTAKE ON THE ORGANISM

It has long been known that the habitual consumption of large amounts of alcohol may produce chronic disturbances of a variety of organ functions. Amongst these may be mentioned the following: cardiac insufficiency, arterial hypertension, a hæmorrhagic tendency, atrophic gastritis, cirrhosis of the liver, endocrine lesions (mainly thyroid and ovary), lesions of the sympathetic nervous system, peripheral neuritis, and a group of poorly defined disorders of the central nervous system (which include delirium tremens, Korsakow's syndrome, Wernicke's syndrome, and a condition described by Jolliffe and his associates as "nicotinic acid deficiency encephalopathy").

The actions of alcohol in producing these disorders should be considered from two points of view:

(a) A direct toxic action rapidly exerted on the nervous cell which causes inebriation.

(b) A secondary action which manifests itself in the entire organism and in which the toxic substance plays a role of alimentary factor of imbalance, provoking nutritional disorders.

Dérobot<sup>12</sup> discussed at some length the production and results of a deficiency in vitamin B<sub>1</sub>. An analysis of the characteristics of alcoholic cardiac insufficiency reveals that they are of the same nature as those occurring in beri-beri and sometimes disappear after the injection of vitamin B<sub>1</sub>. A deficiency of vitamin B<sub>1</sub> has also been held responsible for alcoholic peripheral neuritis and at least partly responsible for some of the disorders of the central nervous system. Dérobot also made some mention of deficiencies of other vitamins (notably A, C and K) resulting from prolonged alcoholism but made no reference to the occurrence of nicotinic acid deficiency.

However, the existence of a close association between alcoholism and pellagra has long been

known (Klauder and Winkelman<sup>21</sup>), and in their analysis of 102 cases of pellagra, Boggs and Padget<sup>22</sup> found that 39% were post-alcoholic. The occurrence of toxic and organic psychoses in pellagra is also well known, and deficiency of nicotinic acid has been held responsible for the development of a number of the disorders of the central nervous system that occur as complications of alcoholism.

Nutritional deficiencies secondary to alcoholism, such as those just mentioned, may be precipitated by a variety of mechanisms. There has almost invariably been prolonged inadequate nutrient intake (due both to ingestion of a nutritionally unbalanced diet and to an overall reduction in intake) and probably also interference with biosynthesis, absorption and/or storage (due to gastro-intestinal and hepatic dysfunction). However, in addition, a clinical deficiency state may be precipitated by other mechanisms (e.g. an increase in nutritional requirements when the alcoholism has been complicated by delirium tremens or certain organic diseases).

#### B. THE ETIOLOGY OF ALCOHOLISM

The acceptance of two important concepts appears to be an essential prerequisite to the resolution of conflicting theories as to the etiology of alcoholism:

(a) Alcoholism is not a single disease entity but a syndrome which may occur in individuals with a variety of personality defects, such as mental deficiency, psychopathic personality, psychoneurosis, schizoid personality, schizophrenia, "cycloid personality," hypomania or depression (Campbell<sup>23</sup>).

(b) The attitudes and patterns of behaviour associated with alcoholism are aspects of personality structure, having biological, psychological and cultural determinants. The relative importance ascribed to these three groups of factors in the etiology of alcoholism (as in the etiology of other mental disorders) varies considerably from one expert to another. However, while each expert is apt to favour the factors belonging to one of these major areas, there is a growing tendency to recognize the importance of all three spheres in etiology.

#### 1. BIOLOGICAL FACTORS.—(a) *Constitution and heredity.*

Kolle<sup>24</sup> in 1939, and a number of earlier authors, emphasized heredity as a major etiological factor, but the view that alcohol addiction is directly inherited is not represented in the literature of the last decade (Gibbins<sup>25</sup>). However, there are still a number of authorities who postulate non-specific hereditary factors. Amark's study (1951) of possible heredity, quoted by Odegard,<sup>13</sup> brings out the difficulty of unravelling the constitutional and environmental factors. Amark drew the tentative conclusion that psychopathy or alcoholism in the father appeared to mean more to the offspring than the environmental factors during childhood. However, the relatively very high incidence of psychopathic inferiority, alcoholism and crime among the fathers and brothers of alcoholics might result from inheritance, or from the sharing of a common environment, or from both.

Clinical analysis of individual cases confirms that alcoholism could seldom be explained as a result of constitutional factors alone. Probably the most widely held view as to the influence of parental alcoholism on the offspring is the following (Henderson and Gillespie<sup>26</sup>): "Alcoholism is much more common in the parents of the insane than of the sane, but alcoholism in the ancestors generally is about equal in the two classes. The fact that alcohol is often a symptom of mental instability has to be remembered in this connection; and especially where the feeble-minded are concerned, in whom the influence of parental alcoholism has probably been viewed in an exaggerated way."

(b) *Physiological factors.*—Alcoholism has been attributed to a number of physiological factors and the distinction must be drawn between those which have been thought to favour the excessive consumption of alcohol, *ab initio*, and those which have been thought to perpetuate the drinking pattern once it has been established ("secondary addiction"). Amongst the individual differences which have been considered to predispose to the development of alcoholism have been included differences in individual tolerance to alcohol, and deficiencies in the endocrine glands (especially adrenals and thyroid). However, many have concluded that such findings in chronic alcoholics are the results and not the initial cause of the addiction.

It has also been postulated that the perpetua-



tion of addiction to alcohol may be affected by toxic factors such as some of the substances produced by incomplete oxidation (e.g. pyruvic acid).

## 2. PSYCHOLOGICAL FACTORS

It is common knowledge that alcohol causes: (a) dissolution of complex cerebral functions; (b) release from cortical inhibition (as illustrated by a definition that has been given of the superego as being "the part of the personality that is most readily soluble in alcohol"); and (c) alleviation of anxiety (both its psychological manifestations and physiological concomitants).

These observations have been verified by Masserman<sup>14, 27</sup> in a series of interesting experiments showing the effects of alcohol on conditioned behaviour in cats. He found that alcohol (1) produces a disintegration of normal adaptive patterns (in order of diminishing complexity) and (2) also causes a temporary reduction of abnormal ("neurotic") behaviour and physiological signs commonly associated with anxiety, in cats with previously induced motivational conflicts.

However, a distinction must again be drawn between those factors held responsible for the initial development of alcoholism, and psychological stresses arising out of past alcoholic behaviour which may tend to perpetuate it. Amongst the latter may be mentioned such obvious factors as marital discord, occupational and financial insecurity, and remorse for past behaviour. Such factors as the personal conflicts of married life or occupational maladjustment are often given as reasons for beginning to drink in the first place, but cause and effect are easily confused and they should only be regarded as aggravating or precipitating factors.

Sexual problems are stressed by the analytical school but Freud's hypothesis of a connection between alcoholism and homosexuality has lost some ground, and a more modern hypothesis of drinking as being part of a pattern of oral sexuality would appear to have little practical value. The contribution of psychoanalysis appears to be rather in its recognition of the importance of early childhood reactions, but one need not be an analyst to appreciate the influence of the child's early relationships with his parents upon the development of his personality. "The individual must conform to the cultural pattern of the society in which he lives, and the ideas, values and the mode of using them are trans-

mitted to the young individual by the parents deliberately, as well as accidentally" (Betlheim<sup>15</sup>).

## 3. SOCIAL AND CULTURAL FACTORS

Certain occupations provide special opportunities for the development of excessive consumption of alcohol. Thus the incidence of alcoholism is high in occupations connected with the production, sale and serving of alcoholic beverages. It is also high in individuals whose occupation keeps them away from home much of the time (e.g. sailors and members of the Armed Services), and in salesmen who may use alcohol to entertain prospective customers.

The importance of poverty and unemployment has frequently been stressed but is not borne out by statistics, and in fact most alcohol problems seem to decrease during periods of financial depression.

More important than any of the above factors are probably the attitudes and habits of the social and cultural groups to which the individual owes his loyalties. Thus in countries with large wine production serious problems arise from excessive drinking which is rooted in social traditions and economic factors rather than individual psychological dependence upon the effects of alcohol. Moreover, within the same country, the incidence of alcoholism may vary greatly between different ethnic groups having different attitudes towards the use and abuse of alcohol. This is exemplified in the United States by a low incidence of alcoholism amongst Jews (although they have their fair share of other forms of maladjustment) and a high incidence amongst the Irish.

In some communities there is also an appreciable difference in the incidence of alcoholism in the two sexes. Some indication of this difference may be illustrated by the numbers of alcoholic patients admitted to Canadian mental institutions during the year 1950<sup>28</sup>—229 male: 45 female patients with alcoholic psychoses, and 235 male: 34 female cases of alcoholism without psychosis. While biological factors might contribute towards this difference in incidence, the mores of the cultural groups involved would appear to be of far greater importance.

## C. THE CLINICAL PICTURE OF ALCOHOLISM

In the report on its first session the Alcoholism Sub-committee of the Expert Committee on Mental Health (WHO) suggested the follow-

ing as an *ad hoc* and provisional definition of alcoholism:<sup>7</sup>

"... any form of drinking which in its extent goes beyond the traditional and customary 'dietary' use, or the ordinary compliance with the social drinking customs of the whole community concerned, irrespective of the etiological factors leading to such behaviour and irrespective also of the extent to which such etiological factors are dependent upon hereditary, constitutional, or acquired physiopathological and metabolic influences."

The sub-committee subsequently considered it more appropriate to use the preceding definition to define the term "excessive drinking," and added to it the following definition of alcoholism:<sup>8</sup>

"Alcoholics are those excessive drinkers whose dependence upon alcohol has attained such a degree that it shows a noticeable mental disturbance or an interference with their bodily and mental health, their interpersonal relations, and their smooth social and economic functioning; or who show the prodromal signs of such developments. They therefore require treatment."

They concluded that all forms of excessive drinking begin with a symptomatic stage (symptomatic of psychological or physical pathology or of social conditions) and that sometimes this stage may be prolonged and not develop further. However, the initial *irregular symptomatic excessive drinker* may, in time, develop such a dependence on alcohol as described in the above definition of alcoholism. In this case the alcoholic may be described as a *habitual symptomatic excessive drinker* unless complete "loss of control" over the alcohol intake occurs, in which case he has become an *addictive drinker (alcohol addict)*.

Excessive drinkers may thus be grouped as follows:

- |  |              |
|--|--------------|
| (i) Irregular symptomatic excessive drinkers | } Alcoholics |
| (ii) Habitual symptomatic excessive drinkers |              |
| (iii) Addictive drinkers (alcohol addicts)   |              |

There are many good descriptions of inebriation and addiction to alcohol, and some of the best are not contained in medical or psychiatric literature. However, the phases of alcohol addiction have been well represented by Jellinek in a chart<sup>8</sup> which shows the usual sequence of appearance of over 40 symptoms frequently associated with alcoholism.

In passing, it may be mentioned that there are a number of studies which tend to indicate that there is a seasonal variation in the incidence of alcoholism which approximates the seasonal variation in suicide. The occurrence of common parent factors appears at present to be a more satisfactory explanation of this than the supposition of any direct causal relationships. A recent

Danish investigation<sup>16</sup> of the relationship between alcoholism and criminal behaviour is also of interest. In this study there was a much higher rate of conviction for minor offences (other than drunkenness—e.g. begging, vagrancy, or unlawful handling of lost property) amongst alcoholics than amongst the general population, but there was no such connection between alcoholics and serious criminal offences.

The *alcoholic psychoses* have already been mentioned in considering the effects of prolonged alcohol intake on the organism. Although these conditions appear to be quite common, not more than about 10% of all alcoholics develop an alcoholic psychosis and in some countries the percentage is even lower.

In view of this low percentage and other considerations, it has been generally assumed that a psychotic predisposition is prerequisite in addition to excessive drinking, in order to produce such alcoholic psychoses as chronic hallucinosis and paranoid states (which are probably manifestations of a hitherto latent schizophrenic reaction). Metabolic changes caused by alcoholism, however, appear to play an important part in the development of such conditions as delirium tremens, acute alcoholic hallucinosis, Wernicke's encephalopathy (also "nicotinic acid deficiency encephalopathy") and Korsakow's syndrome.

#### D. TREATMENT OF ALCOHOLISM

Action taken to combat alcoholism may be either therapeutic or prophylactic. Some of the measures aimed at the prevention of alcoholism will be outlined in the next and final section. Measures that may be adopted in the treatment of established alcoholism may be separated into three main types: (1) disintoxication, (2) deterrents to drinking of alcohol, (3) curative measures directed towards the removal of the causes of drinking behaviour.

##### 1. DISINTOXICATION

The treatment of acute alcohol intoxication and of the concomitant disorders of chronic alcoholism is frequently erroneously regarded as "the treatment of alcoholism," whereas the process of disintoxication should only be considered as preliminary to other measures directed towards the arrest of alcoholic drinking behaviour. The substances employed in order to facilitate this process of disintoxication vary



greatly according to the orientation of the physician. However, those most widely employed are the following, which may be given either orally or parenterally: alcohol, insulin, glucose (in water or saline), liver, vitamins (especially B complex), ACTH, cortisone, and various stimulants (e.g. amphetamine, strychnine) or sedatives and relaxants (e.g. barbiturates, Myanesis, methylamine choline).

## 2. DETERRENTS TO THE DRINKING OF ALCOHOL

These measures are essentially suppressive and not in themselves likely to be curative. Their value lies rather in the insurance of a period of sobriety, during which it is hoped that it may be possible to apply measures that may lead to permanent remission. Deterrent measures may be applied to the individual, or on the social level of action, and include the following: the use of disulfiram (Antabuse), conditioned reflex treatment, hospitalization, and punitive legislation (heavy fines or incarceration).

During the past few years, disulfiram (Antabuse) has been increasingly widely used in the management of alcoholism. This substance has a specific inhibitory effect on the aldehyde oxidizing enzymes, which does not affect the general metabolism. However, after the ingestion of alcohol in the presence of Antabuse, acetaldehyde rapidly accumulates. This leads to such toxic manifestations as peripheral vasodilation, with flushing of the face and increased pulse rate, a drop in blood pressure (sometimes with fainting), throbbing in the head, nausea and vomiting. In doses of 0.25 to 0.5 gm. daily, the toxic side-effects of Antabuse *per se* are minimal and easily controlled. The alcohol-disulfiram reaction, however, may cause collapse, and in a few cases death has resulted. The risks of a severe Antabuse reaction must therefore be weighed against the risks of continued alcoholism in any patient with physical disease, particularly diseases of the heart, liver or kidneys, and cerebral arteriosclerosis.

## 3. CURATIVE MEASURES, DIRECTED TOWARDS THE REMOVAL OF THE CAUSES OF DRINKING BEHAVIOUR

Just as there may be multiple determinants in the etiology of alcoholism, its treatment may, as Lundquist<sup>17</sup> points out, be directed towards three major areas—the somatic, the psychological and the social.

(a) *Biological*.—Somatic therapy is not limited to the procedures applied during the process of disintoxication referred to above. Physical disease of one sort or another may aggravate an existing tendency towards alcoholism and requires treatment. In addition, certain authors have ascribed the predominant role in the etiology of alcoholism to physiological factors, and attempted to remedy the situation by biological measures. Tintera and Lovell, for example, have postulated hypoadrenocorticism (primary or secondary) and have attempted to remedy this by the administration of ACTH or cortisone.

(b) *Psychological*.—After a somatic examination it is necessary to make the diagnosis of the psychological state and social situation of the alcoholic. As previously pointed out, the drinking behaviour may be associated with a variety of psychiatric disorders requiring different methods of therapy. In a few cases physical methods of treatment (e.g. ECT) or prolonged hospitalization may be necessary. However, the majority of cases will respond in varying degrees to different techniques of verbal psychotherapy.

Some direct education will be necessary, both of the individual patient and of his family (and possibly other social contacts). A more indirect approach is frequently possible in group therapy, which is often beneficial to the patient and may also be adapted to the needs of relatives (particularly the marital partner). In a certain proportion of cases it is also possible to effect a resolution of deeply seated conflicts by means of dynamically oriented individual psychotherapy, or psychoanalysis, but even proponents of the latter school are not inclined to advocate its application to the exclusion of other methods of treatment.<sup>18</sup>

It is well to bear in mind that treatment of the original underlying situation (as in "insight therapy") does not of itself remedy some of the superimposed situations and conflicts resulting from prolonged alcoholism,<sup>19</sup> which also require attention.

The lay organization known as Alcoholics Anonymous has a group method of approach to the problems of alcoholism, but their meetings should be distinguished from group therapy conducted by a psychiatrist. All the members of this organization have themselves been alcoholics, and their approach to the problem is both inspirational and spiritual, in addition to which

they function as a social agency in bringing new members (and members who have relapsed) to treatment.

(c) *Social*.—The patient may be given help in familial and occupational rehabilitation by individuals, private agencies (such as Alcoholics Anonymous) or by employees of government. Since a large part of social therapy is dependent on government action and is related to the needs of the community in general, rather than to the needs of the individual, it will be discussed in the next section on public care and prevention.

#### E. PUBLIC CARE AND PREVENTION OF ALCOHOLISM

##### 1. PUBLIC CARE OF ALCOHOLICS

Höjer<sup>20</sup> points out that public authorities in Europe have taken up the care of alcoholics on three levels: the police, the social, and the medical.

In some countries (e.g. Scotland, France, Italy, Spain) alcoholism is officially little recognized or understood and, in spite of a possibly large number of alcoholics, the work of the police represents the only public care provided.

The next phase developmentally is social care (voluntary or public). The Nordic countries, Norway, Sweden and Finland, have the prototypes of the most highly developed organizations for social care in Europe, but differ somewhat from one another in details. In Sweden every community has a temperance board, and there are a number of institutions for the care of alcoholics. Around 1940 most cases seen by the temperance boards were sent to one or other institution for from one to several years, but ten years later 75% of these addicts were still addicts. The trend in this type of social care is illustrated by the fact that in 1950 only 3% of more than 25,000 cases handled by Swedish temperance boards were sent to institutions. Treatment was being initiated earlier and becoming increasingly open, with home care for inebriates and also placement in inebriates' hostels where the patients continued their ordinary work. Public social care of this type is supplemented by the help of a good number of voluntary workers, amongst them members of Alcoholics Anonymous.

The most recent phase in the development of public care of alcoholics is that of medical treatment. This implies that alcoholism 'is no longer regarded as immoral, but as evidence of

sickness. In the past few years, physicians have become increasingly active in organizing the care of alcoholism (privately, in clinics, and in hospitals) and it appears likely that the next development in the handling of this problem will be its organization by public health authorities.

##### 2. PREVENTIVE AND CONTROL MEASURES

The most effective long-term preventive measure is probably education of the public,<sup>17</sup> not only concerning alcoholism but also in all aspects of mental health. This education could begin in school and should also be given to adults (particularly the parents of young children, teachers and other professional groups) through such media as the film, the press, and the radio, as well as directly.

Control in the use of alcohol itself may be imposed by restrictive legislation. Measures adopted in the past have included total prohibition of alcohol and increases in the penalties for offences in which alcohol has played a part. The sudden imposition of a heavy tax, however, is more likely to act as a deterrent. The effect of this may be illustrated by the incidence in Denmark of delirium tremens during the years preceding and following the imposition of a heavy tax on liquor (in 1916, 27 per 100,000 and in 1919, 1.7 per 100,000 inhabitants). Other measures of control include the establishment of a production monopoly by the State (as in Norway, where the State enjoys a monopoly of the importation, distillation, the whole preparation and sale of alcohol), the limitation of the number of liquor stores, and the rationing of purchases.

In conclusion it may be added that the Alcoholism Sub-Committee of the Expert Committee of Mental Health (WHO) considered that public health services could make extensive contributions to prevention and treatment. Their first recommendation<sup>7</sup> therefore was that WHO should take all steps within its power to stimulate public health services to undertake work on this problem, and should be prepared to provide advisory, educational, and other services on this subject to such national health authorities as requested them. However, at their second session the Alcoholism Sub-Committee concluded<sup>8</sup> that progress in the various phases of the problem of alcoholism was most feasible only after the large number of alcoholics throughout the world had been considerably diminished through a large-scale rehabilitation effort.



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## VITAMIN B<sub>12</sub> AND THE GROWTH OF CHILDREN: A REVIEW\*

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VITAMIN B<sub>12</sub> is known to be specific for the treatment of pernicious anæmia but its role in promoting growth in children has not been so firmly established. Vitamin B<sub>12</sub> deficiency can be produced in chickens and some experimental animals and it has been shown that retarded growth is an important criterion of deficiency. No similar deficiency state has been demonstrated in man, and the nature of the effect of vitamin B<sub>12</sub> on the growth of children has not been clearly defined. Available data on this problem have often been interpreted rather optimistically, particularly in uncritical reviews and in medical advertisements. Little consideration has been given to the limitations of individual experiments which appeared to show an effect, or to the presence of experiments showing no effect.

In view of this situation and since regulations under the provisions of the Food and Drugs Act were being amended, it seemed desirable to review the available literature in a critical manner. The effect of vitamin B<sub>12</sub> has been studied on the growth of "normal," "under-

weight" and chronically ill children. This paper is concerned primarily with the former two groups where growth and development have been the chief criteria used.

Employing the Wetzel grid technique, Wetzel *et al.*<sup>1</sup> found that five of 11 children in growth failure showed a significant response to 10 micrograms of vitamin B<sub>12</sub> given orally per day, as measured by their progress along the grid. In a more recent experiment, Wetzel *et al.*<sup>2</sup> reported similar findings when larger groups of children were used. In the latter experiment, all the children studied were carefully examined regularly for some time prior to the oral administration of 10 mcg. of vitamin B<sub>12</sub>, to determine which children showed growth failure. Sixty children were divided into four groups. Group A, consisting of 20 normal children, received no supplement. Group B, containing 20 children in growth failure, received 10 mcg. of vitamin B<sub>12</sub> daily for 16 weeks. Group C, containing 16 children in growth failure, received the same dose for six weeks. Four children in growth failure received no supplement and were considered negative controls (Group D). A positive effect was observed in 23 of the 36 children who received vitamin B<sub>12</sub>. The authors concluded that vitamin B<sub>12</sub> exerted a "growth-promoting" effect when given orally as a dietary supplement to children in growth failure. In addition it was stated that parents and teachers

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of these children noted an improvement in their behaviour and scholastic ability.

The Wetzel grid is a continuous record of physical development, the appropriate measurements being plotted at regular intervals along the grid. Channels of growth corresponding to physical status are correlated with chronological age. It is claimed that the technique is sufficiently sensitive to detect very small growth changes. It has the further advantage that each child serves as his own control.

In spite of the advantages of this technique, there are several criticisms which may be made of the experimental design used by Wetzel *et al.* Twenty children were used as "normal controls" (children growing at a normal rate) and, as would be expected, it was found that their growth-rates were unchanged during the course of the experiment. It would appear that the real "controls" should have been the group of children with growth-failure who received no supplement. This group consisted only of four children who had been removed from other groups. Furthermore, it is not clear that the results obtained can be definitely attributed to vitamin B<sub>12</sub>. These and other points have been brought out recently in a critical review.<sup>3</sup>

Wilde<sup>4</sup> reported that 2 mcg. of vitamin B<sub>12</sub> per day given orally to normal Aleutian infants increased the rate of growth as shown by the Wetzel grid. Of seven infants receiving the supplement, four showed a positive response, one showed no response and two gave negative responses. No controls were employed and it is obvious that too few children were tested to draw any conclusions from such variable data.

Possibly the most critical study in which a positive effect for oral vitamin B<sub>12</sub> supplementation is claimed, is that reported by Jolliffe *et al.*<sup>5</sup> The subjects were "underweight children on low protein diets" resident in an orphanage at Rome, or from the depressed area of Gaeta. At both locations the children were grouped into two homogeneous groups. A total of 172 children received 20 mcg. of B<sub>12</sub> daily for 7 months. A similar group of 179 served as controls. Data from the study were analyzed statistically and it was concluded that the oral administration of vitamin B<sub>12</sub> resulted in a highly significant increase in weight gain of children between the ages of 7 and 11. It was pointed out that their diets were lower in calories and animal protein than the U.S. recommended daily allowances.

Not all workers have experienced as favourable results and their work has not been quoted as extensively. In another critical study on the oral administration of vitamin B<sub>12</sub> to underweight children, Benjamin and Pirrie in England<sup>6, 7</sup> found no effect. Ten mcg. of vitamin B<sub>12</sub> was given orally to 247 underweight children; 239 similar children employed as controls received no supplement. Height and weight measurements were made at the start and at four weeks and eight weeks after commencement of the experiment. Children divided into sex and age groups were considered separately and together. These workers concluded that vitamin B<sub>12</sub> had no effect on the gain in height or weight. An examination of their data reveals that any apparent difference favoured the "controls" rather than the children receiving added vitamin B<sub>12</sub>, but differences were not significant. It is possible that the eight-week period of supplementation was not adequate, for Wetzel's results were much less significant at six weeks than at 16 weeks. Wetzel<sup>2</sup> has criticised their work because of the wide limits of error, but the other arguments he used to explain the negative results of Benjamin and Pirrie are questionable.

Other workers have also obtained negative results. Downing,<sup>8</sup> Rascoff<sup>9</sup> and Finberg and Chow<sup>10</sup> reported that vitamin B<sub>12</sub> did not stimulate the growth of premature infants. Spies,<sup>11</sup> using the Wetzel grid, studied the growth-promoting effect of vitamin B<sub>12</sub> on nine children with growth failure coming from a low income area and receiving inadequate diets. None of the children showed a response to vitamin B<sub>12</sub>. Spies concluded that these children needed increased amounts of a well-balanced diet rather than one specific vitamin. The most significant changes were improved appetite, vigour and cooperation. Even though the children had better appetite, circumstances beyond the control of the families (in all but three cases) prevented the children from consuming more food.

Scrimshaw<sup>12</sup> carried out two extensive experiments in Guatemala and El Salvador, employing school children on a diet low in animal protein. Oral vitamin B<sub>12</sub>, antibiotics and several protein foods were evaluated for growth-promoting effects. However, since separate schools were used for treatment and control



groups, the experiment cannot be considered to be properly controlled. In any case, the differences were not large enough to show any significant effect of vitamin B<sub>12</sub>.

Larcomb, Perry and Peterman<sup>13</sup> conducted an experiment on children in institutions for the deaf and blind. These children were normal except for sight or hearing disorders. All children received a multivitamin capsule containing 1 mcg. of vitamin B<sub>12</sub> per day. The treatment group, consisting of 60 children, received 20 mcg. of vitamin B<sub>12</sub> daily for eight months. The control group of 72 children received placebos. The differences between group averages were not significant. However, when these groups were subdivided into "underweight," "normal" and "obese" groups of children and the data submitted to more rigorous statistical examination it was found that vitamin B<sub>12</sub> caused significant weight gains in the underweight, and significant height and weight gains in the obese group. No effect was observed on normal children. The numbers of children in each group were not stated.

Finally, there are a number of favourable reports on the dietary use of vitamin B<sub>12</sub> for chronically ill children. In 1951 Chow<sup>14</sup> studied the effect of oral administration of 5 and 25 mcg. doses daily to chronically ill and normal children. With the 25 mcg. dose (but not with 5 mcg.) both groups gained more weight than the corresponding control group of children. However, Chow stressed that "owing to the heterogeneity of the subjects with chronic illness and the small numbers of normal children studied, the results are merely suggestive of trends." Chow reported further work<sup>15</sup> in 1952 in which 47 chronically ill children were given a daily oral dose of 25 mcg. of vitamin B<sub>12</sub> and 45 similarly ill children served as controls. As this author stated, "the mean weight changes strongly suggested that children receiving the supplement gained more rapidly when both groups of children were offered the same diet *ad libitum*." Vitamin B<sub>12</sub> has also been administered orally for the clinical treatment of malnutrition,<sup>16, 17, 18</sup> coeliac disease,<sup>15</sup> diarrhoea,<sup>15, 16</sup> tonsillitis and infantile cirrhosis.<sup>19, 20</sup> However, these reports do not describe controlled experiments but consist mainly of case histories and contribute little to the evaluation of the growth-promoting effect of vitamin B<sub>12</sub> in children.

## DISCUSSION

A critical examination of the available data on this subject reveals no agreement in elucidating the effect of vitamin B<sub>12</sub>. Only the study of Jolliffe *et al.* on Italian children showed a clear-cut statistically significant effect of vitamin B<sub>12</sub> on the growth of children. The reports of Wetzel *et al.* and of Larcomb, Perry and Peterman appeared to indicate a favourable effect from vitamin B<sub>12</sub> supplementation. However, a group of experts<sup>21</sup> reviewing Wetzel's work concluded<sup>3</sup> that "until more critical studies of the effect of vitamin B<sub>12</sub> on the growth and learning of school children in growth failure are reported in the literature the widespread use of this vitamin as a growth promoting substance is not justified and should be discouraged." Benjamin and Pirrie, and Spies found that vitamin B<sub>12</sub> produced no effect on the growth of underweight children. The work of Wilde and Scrimshaw contributes nothing to the present discussion. The reports of Downing and Rascoff indicated that vitamin B<sub>12</sub> had no effect on the growth of premature infants. Possibly some of the variation in results obtained can be explained on the basis of the diverse conditions under which the tests were run, including duration and dosage level of supplementation, nutritional and physical status of children, and accessibility to extra food.

In the face of this variety of opinion, it is obvious that definite conclusions regarding the possible effect of vitamin B<sub>12</sub> cannot be reached. More obvious is the need for critical studies involving adequate controls, proper design, and sufficient numbers of subjects. Certainly no effect can be expected on "normal" children. Indeed, if this occurred, vitamin B<sub>12</sub> would have more of the action of a hormone than a vitamin. Furthermore, as has been pointed out,<sup>3</sup> there is no information available on the significance or importance of rapid weight gains as a criterion of optimum human development and health.

At a recent conference on vitamin B<sub>12</sub>,<sup>22</sup> it was stated that no studies meeting the following criteria "have failed to support the thesis that oral supplementation with B<sub>12</sub> has a beneficial effect on child growth. These criteria are: (a) previous history of nutritional stress, including vitamin B<sub>12</sub> deficiency; (b) *ad libitum* access to food during the study period; and (c) adequate nutrients and calorie distribution in the diets offered." The criteria appear to be unrealistic

for it is evident that few studies have met them, particularly with reference to part (a). It might be difficult to find groups of children with vitamin B<sub>12</sub> deficiency, at least in the U.S. or Canada. In fact, no one has described the symptoms of a vitamin B<sub>12</sub> deficiency. It is unlikely that either Wetzel's group of children or that of Larcomb and Peterman met criterion (a). It should be noted that the only study to date in which a definite statistically significant effect was found was that of Jolliffe *et al.* on Italian school children whose diets were low in animal protein. Possibly those children had a vitamin

TABLE I.

VITAMIN B <sub>12</sub> CONTENT OF FRESH FOODSTUFFS (MCG./100 GM.)				
Food	Microbiological assay	Ref.	Rat assay	Ref.
Chicken.....	2.9 - 3.6	23		
Beef liver.....	40.9 - 62.3	24		
Beef kidney.....	14.8 - 23.1	24		
Beef round.....	1.3 - 2.3	24	3.7	25
Lamb.....	1.7 - 3.2	24	5.6 - 8.6	25
Pork ham.....	0.9	24	1.2	29
Mutton.....			3.0	29
Clams.....	6.0 - 9.0	26		
Clams (canned).....	3.8	26		
Red codfish.....	12.0	27		
	(dry wt.)			
Milk (cow).....	0.66	28		
Milk (goat).....	0.012	28		
Milk (human).....	0.04	28		
15% whole milk powder.....			2.5	29
Cheese.....			1.4	29
Egg yolk.....	2.4	30	1.4	29

B<sub>12</sub> deficiency. Furthermore, it is difficult to foresee an effect of vitamin B<sub>12</sub> where adequate nutrients and calories are contained in the diets offered (criterion c).

In this regard, it is interesting to speculate on human requirements for vitamin B<sub>12</sub> and how they may be met. Table I shows the vitamin B<sub>12</sub> content of common sources of animal protein.<sup>23 to 30</sup> Cereals and vegetables contain little or no vitamin B<sub>12</sub>. Based on these figures, one might expect that nutritionally adequate diets would furnish at least 2-3 mcg. vitamin B<sub>12</sub> daily. The upper limit must be extremely variable and may be quite high, particularly when organ meats are consumed. On the other hand, many people existing almost wholly on vegetable diets must have an extremely low intake of vitamin B<sub>12</sub>. It would therefore appear that the minimum requirement is very low. In a recent

book on vitamins, Bethell<sup>31</sup> stated, "Although B<sub>12</sub> is an essential nutrient, it appears that normal nutrition and blood cell production can be maintained in an almost complete absence of a dietary supply of the material. In such cases, where the diet has been lacking in foods of animal origin, the nutritional needs must, presumably, be met by intestinal bacterial synthesis of the vitamin." It is, therefore, very difficult to understand how persons ingesting reasonable amounts of meat, eggs, and milk can be deficient in vitamin B<sub>12</sub> or how they can be expected to show an effect from vitamin B<sub>12</sub> supplementation. It has been suggested that vitamin B<sub>12</sub> may stimulate the appetite and that weight gains might result from higher food consumption, but Bayne and Boger<sup>32</sup> working with adults in a controlled experiment found no suggestion of this.

Other possibilities remain but only limited information is available. Those children who showed a response to vitamin B<sub>12</sub> may have had either faulty absorption or an intestinal flora which did not promote intestinal synthesis and/or competed with the host for dietary vitamin B<sub>12</sub>. In addition to showing whether or not vitamin B<sub>12</sub> has an effect on the growth of underweight children, future studies should also be designed to throw some light on the importance of these factors and on the mechanism of action of vitamin B<sub>12</sub>. Bethell<sup>31</sup> stated, "Further investigations should be carried out with particular reference to dietary analyses of the subjects, random selection of B<sub>12</sub> recipients and controls, and provisions to avoid subjective bias on the part of those conducting the tests as a possible determinant in the results."

#### SUMMARY

Nine reports on the oral administration of vitamin B<sub>12</sub> to normal and underweight children and several reports on its use for chronically ill children have been reviewed. The reports are conflicting and demonstrate, above all, a need for critically controlled experiments before any definite conclusions can be reached regarding the possible effect of vitamin B<sub>12</sub> on growth in children. To date, available evidence indicates that the effect is far from spectacular and that there is little, if any, justification for the widespread use of vitamin B<sub>12</sub>.



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## LEFT PARADUODENAL HERNIA

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THE SUBJECT of left paraduodenal hernia has been discussed in the literature from time to time ever since Treitz described the anatomy in 1857. Peritoneal fossæ about the duodenum were first mentioned by Hensing (1742) and subsequently in greater detail by Huschke (1844). These fossæ and herniæ are thought to be commonest in the region of the duodeno-jejunal flexure because this is the proximal fixed point during the three stages of mid-gut rotation in the foetus.<sup>11, 22</sup>

It was Treitz who accurately portrayed the left paraduodenal fossa into which the hernia occurs, and stressed the importance of the vascular arch which surrounds the neck of the fossa. This arch, which now bears his name, is comprised of the aorta posteriorly, the inferior mesenteric artery and its upper left colic branch inferiorly and anteriorly, and the inferior mesenteric vein anteriorly and superiorly. He enumerated three essentials indispensable to formation of the hernia: (1) The existence of a fossa and its boundary fold. (2) The presence of the inferior mesenteric vein in the fold. (3) Freedom of movement in the small intestine to such an extent as to permit of its introduction into the hernial sac formed at the expense of the fossa.<sup>1</sup>

Waldeyer, in 1886, emphasized that elevation of the peritoneum by the inferior mesenteric vein and left colic artery was the important factor in the formation of this fossa.<sup>23</sup> During the latter

half of the nineteenth century several authors disputed the necessity of the "vascular arch of Treitz" as marking the boundaries of left duodenal hernia. However, as Moynihan suggests, the numerous fossæ about this area which sometimes coexist caused some confusion until Jonnesco (1895) described five different ones. Moynihan himself in 1899 mentioned nine fossæ. He gave credit to Landzert (1871) for first describing the left paraduodenal fossa accurately in relation to adjacent fossæ. McGregor stated that the left paraduodenal fossa is found in 20% of persons and never exists together with other types of duodenal fossæ.<sup>17</sup>

Since the excellent monograph by Moynihan there has on occasion been some confusion about this hernia, as will be described. Little new light has been cast on the problem of its origin and development since his description, which will therefore be quoted here in part:

"In its typical form, seen most frequently in the foetus or the newly-born, the fossa may thus be described: It is situated to the left and some distance from the ascending limb of the duodenum. The fossa is caused by the raising up of a fold, the plica venosa, by the inferior mesenteric vein—a fold which may be not inaptly described as a "mesentery" of that vein. Behind, the sac is bounded by the parietal peritoneum covering the psoas, the renal vessels, the ureter, and a portion of the left kidney. The orifice of the sac is wide, and looks downwards and to the right; the blind extremity is directed upwards and slightly to the left. The width of the orifice depends, of course, upon the distance between the inferior mesenteric vein and the duodeno-jejunal flexure, a distance which is capable of great variation. The plica venosa consists of a vertical and a horizontal portion, the vertical being to the left and below the fossa, and the horizontal bounding the fossa above. The inferior mesenteric vein forms a bow-shaped curve as it arches over to the right above the duodeno-jejunal flexure. Below, the

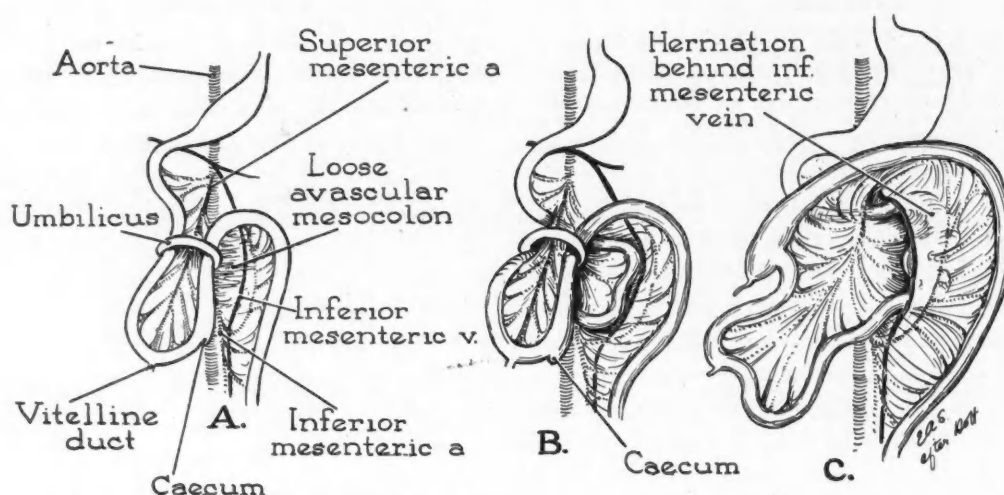


Fig. 1.—Formation of left paraduodenal hernia. A.—Second stage of rotation of the mid-gut with bowel returning to abdomen from umbilicus. B.—Proximal loops are guided from right to left behind superior mesenteric artery. C.—Herniation of loose avascular peritoneum behind inferior mesenteric vein.

fossa is limited by a serous fold, the mesenterico-mesocolic fold, running from the left side of the mesentery downwards, and a little outward to the right side of the mesocolon of the upper portion of the omega loop. Hence the fossa and the fold are vascular in origin. In the neck of such a sac can always be seen the inferior mesenteric vein. The left colic artery may be closely applied to it or may be at some distance away. But of the position of the inferior mesenteric vein in all specimens I have examined, there is no doubt whatever.<sup>18</sup>

In spite of this clear description, misunderstanding has arisen in subsequent reports in the literature. Andrews<sup>3</sup> felt that the hernia was produced as a result of a congenital anomaly in the development of the peritoneum related to abnormal rotation of the gut in the foetus. He described a failure of the second stage of rotation or a reversed rotation through 180 degrees as the mechanism by which the small bowel was caught beneath the mesentery of the colon. This however is more apt to produce a condition similar to that mentioned by Haymond and Dragstedt,<sup>12</sup> in which the duodenum and jejunum were found to be anterior to the superior mesenteric artery. Left paraduodenal hernia is not produced by such malrotation. Papez (quoted by Ziskind<sup>23</sup>) believed that these hernias were caused by anomalous rotation of the mid-gut in the foetus, in that as the small bowel was drawn into the abdominal cavity from the umbilicus, the bowel carried in the surrounding peritoneal umbilical sac. Ravdin and Hodes<sup>19</sup> presented a case report of a retroperitoneal (mesenteric pouch) hernia, but no vessel was found at the mouth of the sac. Manfredi<sup>15</sup> described three cases of paraduodenal hernia. One said to be a right hernia was found to have the inferior mesenteric vein as the

left boundary of the aperture. Giles *et al.*<sup>9</sup> presented two cases of left mesenterico-parietal hernia, but the inferior mesenteric vein was not described as being in the edge of either sac. Zimmerman and Laufman<sup>22</sup> stated that in the production of paraduodenal herniae, incomplete rotation of the mid-gut in the foetus resulted in a right-sided hernia, whereas reversed rotation produced the left hernia into the fossa of Landzert.

Some clear reports are found, however, and these will serve to elucidate the situation in regard to pathology and diagnosis. Dott<sup>7</sup> and Gardner<sup>8</sup> both discussed anomalies of intestinal rotation and, although their papers are separated by a quarter of a century, neither author considered paraduodenal hernia as one of the anomalies of rotation. Treitz described the vascular arch surrounding the mouth of the left paraduodenal fossa. Moynihan confirmed this and stressed the major importance of the inferior mesenteric vein as causing the fold of peritoneum at the neck of the sac. Longacre<sup>14</sup> stated that the inferior mesenteric vein was sometimes not found in the neck of the sac at operation because of a lack of time for dissection, due to the patient's condition often being poor. Callander, Rusk and Nemir<sup>4</sup> made a plea for a different nomenclature, suggesting that left paraduodenal hernia should be called hernia into the descending mesocolon. Their account of the pathogenesis of this hernia is lucid and probably the most accurate.

In the developing foetus, an avascular space is present in the descending mesocolon between



the inferior mesenteric vessels and the root of the mesocolon. This space is represented only by very loose peritoneum (Fig. 1A). During the second stage of rotation of the gut (about the tenth week) the mid-gut loop returns to the abdominal cavity from the umbilical cord. The proximal loops of upper jejunum and ileum return first and are guided to the right side of the superior mesenteric artery (which vessel is fixed to the umbilicus in its terminal portion). The space on the right side is limited, so the first coils to return are shunted *to the left behind* the taut artery (Fig. 1B). As they enter the left side, they push against the descending mesocolon and normally force the descending colon to occupy the left flank. The "pressure" is exerted near the base of the mesocolon, so that the loops might easily engage the unsupported loose avascular portion and push it outwards (to the left). Thus the jejunum would tend to slip *behind* (posterior to) the unyielding plica venosa containing the inferior mesenteric vein, instead of sliding in front of the vein (Fig. 1C). The descending mesocolon normally falls to the left and fuses with the primitive posterior parietal peritoneum. This is interfered with by the invagination of the loose mesocolon and the resistance of the inferior mesenteric vein. All the small bowel may enter the enlarging sac, which is virtually in the descending mesocolon (Fig. 2). Case reports however describe hernias containing from a few cm. to almost the entire small bowel.<sup>1, 3, 23</sup> Only small bowel has been found within the sac. No large bowel and no omentum take part in the hernia. The second stage of rotation is completed, as is the third, so that the relationships of terminal ileum and cæcum are normal. The descending colon will come to lie to the left of or anterior to the sac—occasionally antero-medially.<sup>4, 11, 13, 18</sup>

In support of this embryological development of the hernia is the finding of such abnormalities in the foetus and infant<sup>3, 11, 23</sup> (also described by Vogt, Broesike, and Treitz). Moynihan suggests that fusion of the peritoneum may be delayed till after birth, and this may support in part the view that the hernia develops during extra-uterine life.<sup>23</sup> Hansmann and Morton stress the view that the fossa and hernia are expressions of regional weakness, rather than the causative role of the fossa.

According to reports in the literature, the incidence of left paraduodenal hernia has been

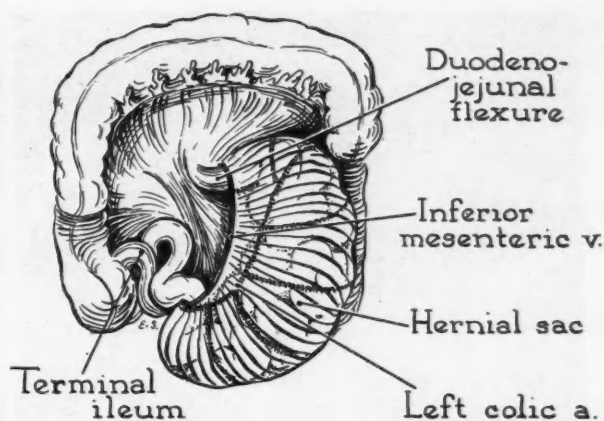


Fig. 2.—Left paraduodenal hernia. Drawing to represent hernia as it appeared at operation in the case described.

fairly constant in relation to other intra-abdominal herniæ. Moynihan reported 74 cases of paraduodenal hernia found in the literature up to 1906. Fifty-seven were left-sided and 17 right, which gives an approximate ratio of three left to one right. Longacre raised the figure to 140 cases, there being 105 left to 35 right, thus preserving the ratio of 3:1. Of the total number of cases, five had been diagnosed preoperatively. Hansmann and Morton found reports of 467 cases of intra-abdominal hernia up to 1939. Of these 185 (53%) were paraduodenal, 138 left and 47 right (3:1). Mayo *et al.*<sup>16</sup> in 1941 reported a series of 8 cases of paraduodenal hernia seen at the Mayo Clinic between 1910 and 1939. Six were left-sided and two right (3:1). The only comments on sex incidence suggest a male preponderance.<sup>11, 16</sup>

Signs and symptoms in relation to the hernia are extremely variable and may occur at any age. The hernia may be discovered incidentally at autopsy.<sup>1, 23</sup> On the other hand there may be a sudden onset of signs and symptoms of complete small bowel obstruction.<sup>6, 14, 16, 22</sup>

A number of patients will provide a history of intermittent colic with or without vomiting, and a sense of heaviness or periodic distension of the abdomen for a long time. Gaseous eructations and heartburn may be described as well as an excess of borborygmi. Cathartics and enemas sometimes provide relief.<sup>9</sup> These symptoms may lead up to an attack of acute bowel obstruction.<sup>14</sup> At physical examination, distension of the abdomen is usually found. This may be eccentric, situated on the left side or in the left upper quadrant. Palpation confirms the impression of a vague soft to firm mass which is tympanitic in part and gurgles.<sup>4</sup>

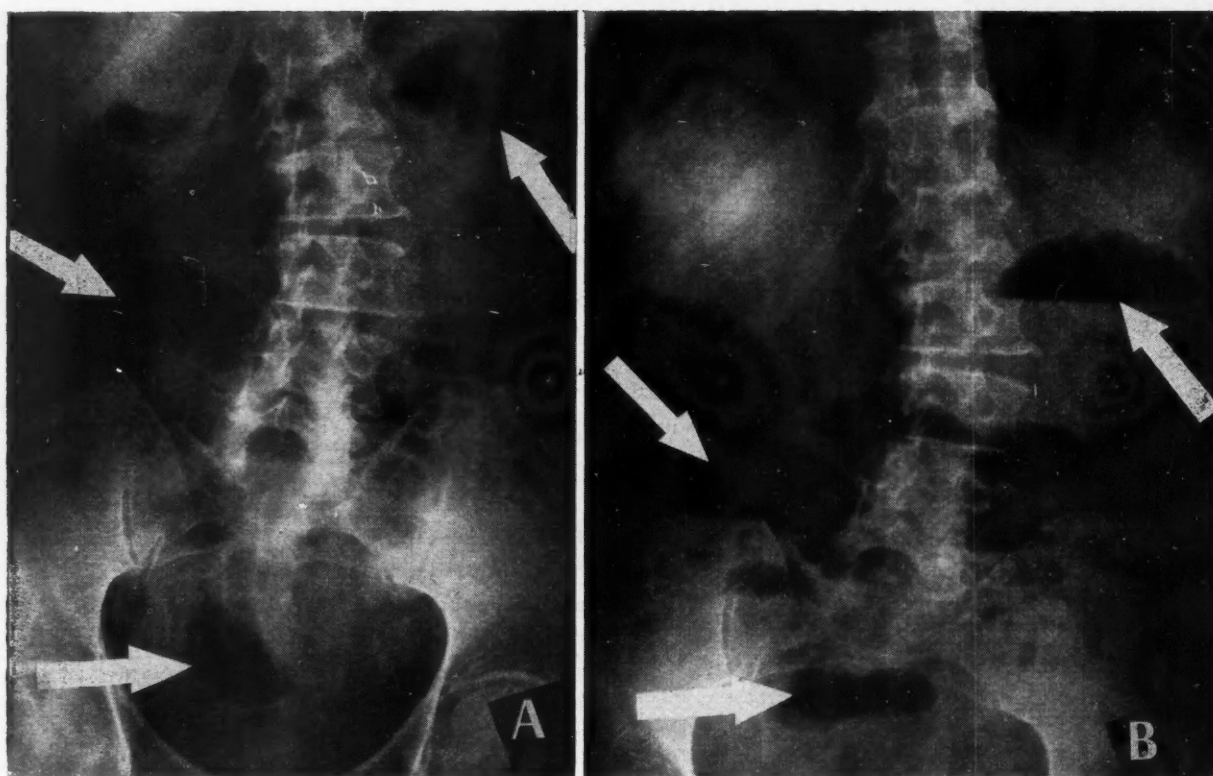


Fig. 3.—Radiographs of abdomen taken preoperatively in case described, which show limited mobility of gas-filled loops. A.—Patient supine. B.—Patient standing.

Radiography of the abdomen now plays an important part in confirming the diagnostic impression. A flat film taken with the patient in the supine and erect positions will show two or more loops of distended small bowel in an unusual situation, while the rest of the intestine has little gas. The loops will appear to be confined to a certain well-bounded zone which is more or less spherical. They are well supported in the abdomen. Limited mobility is demonstrated when the patient's position is changed (Fig. 3). Barium has been used on occasion to demonstrate the apparent enclosure of the mass of small bowel in a sac with rounded contours. Several authors give the impression that x-ray diagnosis is more successful in right-sided than in left-sided paraduodenal hernia.<sup>5, 10, 20</sup>

At operation no small bowel or very few loops will be seen. Instead, a smooth peritoneal mass appears which is the wall of the sac.<sup>21</sup> On opening the sac, some distended loops of small bowel will be encountered if the patient has shown signs of obstruction. The neck of the sac is not always distinct, and is most easily identified by following the terminal ileum upwards from the cæcum. The site of obstruction will be found to lie at the point of exit of the small bowel from the sac, the edge of the sac impinging on the

lumen. It may be difficult to find the third part of the duodenum or the duodeno-jejunal flexure because these are virtually within the upper part of the wall of the sac. The intestine should be reduced into the general peritoneal cavity, and this may require enlargement of the neck of the sac. If possible the inferior mesenteric vein should be protected, hence the sac is best opened downwards. The left colic artery must first be identified, and is frequently found to lie away from the actual edge of the sac. Aird states that ligation and division of the inferior mesenteric vein is not followed by any ill effects if it is found to be stretched in the neck of the sac, because a collateral circulation will have developed by the time of operation.<sup>2</sup> Some writers suggest no further procedure than reduction of the hernia, claiming that recurrence is extremely rare.<sup>9</sup> Others advocate closing the mouth of the sac with a purse-string or continuous suture. The general condition of the patient, the state of the circulation of the involved intestine and the amount of injury to the intestinal wall are the important factors in surgical prognosis.<sup>11</sup> The mortality of the operation was previously high, but more survivals are being reported.<sup>9, 15</sup>



# CASE HISTORY

N.B., a 62-year-old white male, was admitted to hospital on Feb. 22, 1953. His complaints were crampy abdominal pain and vomiting for three days. The personal history revealed an admission to another hospital four and a half years previously for closure of a perforated ulcer on the anterior surface of the first part of the duodenum. Symptoms referable to his stomach had been present for four years prior to the perforation. The ulcer was closed and no abnormal findings were recorded at the time of operation. Subsequent barium series revealed gross deformity of the duodenal cap.

The patient had been well until the present admission. The crampy abdominal pain was felt about the umbilicus, and the vomiting was aggravated by food.

Physical examination revealed a fairly healthy man with a temperature of 100° F., pulse 110, and blood pressure 130/82. He was moderately dehydrated. The abdomen was protuberant and tympanitic, and relaxed poorly. Tenderness was present to the left of the umbilicus. No masses were felt. Radiographs of the abdomen in the supine and erect positions showed some distended loops of small intestine which had air-fluid levels. This was thought to be indicative of some intestinal obstruction. The loops were fixed in position (Fig. 3). There was no evidence of tumour. The Hb was 14.7 gm. %, the white cell count 5,900. A Cantor tube was inserted down to the stomach and continuous suction established. The diagnostic impression was of small bowel obstruction, probably from postoperative adhesions.

A few hours after admission, laparotomy was performed through a left paramedian incision under spinal anaesthesia. Some blood-tinged fluid escaped as the peritoneum was opened. Loops of discoloured bowel could be seen through a layer of peritoneum. This was found to be a sac with an opening facing to the right in the free edge of which coursed the inferior mesenteric vein. It was therefore presumed to be a left paraduodenal hernia (Fig. 2). All the small bowel was contained in the hernial sac down to a point two feet proximal to the ileo-caecal valve. The obstruction appeared to be at the site of exit of the ileum from the neck of the sac, the point of entrance at the duodeno-jejunal flexure being almost included in the wall of the sac. The inferior mesenteric vein was freed downwards to allow reduction of the hernia and then sutured to the posterior parietal peritoneum, thus obliterating the neck of the sac. No artery was found in the edge of the sac, the left colic artery being further to the left. The abdomen was closed without drainage, the bowel being completely viable. The patient returned to the ward in good condition, having received 500 c.c. of whole blood during the operation. He was discharged two weeks later and has since been well and free from symptoms. (Last seen February 1954.)

# COMMENT

The case presented is typical of the condition described. The onset of symptoms was fairly sudden. In retrospect it was recalled that the abdominal distension was definitely more marked on the left side; a more astute observation could have led to a differential diagnosis including left paraduodenal hernia. The presence of a previous operation was however confusing. The only residual adhesions from the previous procedure were found to be around the pylorus. Obviously, in closing the perforated ulcer the greater omentum and transverse colon had not been reflected

upwards to reveal the presence of the hernia, nor had there been any indication to follow through the barium series. Identification of the inferior mesenteric vein was easy, and the mouth of the sac was enlarged downwards without difficulty.

# SUMMARY

1. The subject of left paraduodenal hernia has been discussed with a review of opinions regarding pathogenesis and diagnosis.

2. The finding of a hernia or fossa extending towards the left with the inferior mesenteric vein lying in the free edge of the sac is diagnostic.

3. Radiography is an important aid in diagnosis, particularly in demonstrating limited mobility of the small bowel loops.

4. More cases should be diagnosed preoperatively when there is an increasing awareness of the possibility of the condition.

My thanks are due to Dr. E. A. MacNaughton, surgeon at the Queen Mary Veterans' Hospital, for permission to publish this case, and for reading through the manuscript, also to Miss Eleanor Sweezey for the excellent illustrations.

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Carruthers Clinic.

# SOME LIMITATIONS AND PITFALLS IN ELECTRO- CARDIOGRAPHY, WITH SPECIAL REFERENCE TO PULMONARY DISEASE\*

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THE USE OF ELECTROCARDIOGRAPHY has become so widespread in recent years that in many quarters it is considered standard medical practice. This development is fully warranted by the electrophysiological advances made during the last 15 years since the pioneer work of Wilson, and by the clinical and anatomical correlations observed in the same period of time. The practice of electrocardiography has also been fostered by the development of instruments simple and reliable in manipulation, making the technique available in standard clinical work. Finally, a psychological factor gives electrocardiography an advantage over mere clinical methods, for the tracing is an objective record, sometimes considered more reliable than bedside methods. The last point is at least debatable since electrocardiographic interpretation involves in part a subjective factor.

It is not sufficiently emphasized that electrocardiography has many limitations. When diagnosis and consequently prognosis are based exclusively on electrocardiographic findings, false conclusions may readily be drawn. An ominous prognosis due to rigid interpretation of minor deviations may induce psychological disturbances and cardiac neuroses in patients.<sup>1, 2</sup> This was not the purpose of the pioneers in the field, who did not fail to point out its limitations. Wilson himself often commented that the more a physician knew about electrocardiography, the more conservative his evaluation of the records would be.<sup>3</sup> It is the purpose of this review to list some of the important limitations and causes of error in electrocardiographic interpretation.

*Clinical and electrocardiographic correlations.*—One of the principal limitations of electrocardiography is the lack of correlation between the severity of cardiac disease and the degree of abnormality of the record. The electrocardiograph picks up action currents which develop in special conductive tissues. Consequently, minor lesions affecting the conduction paths may distort

the tracing tremendously. On the other hand, lesions exclusively affecting muscular tissue may not affect the electrocardiogram.

*Evaluation of cardiac reserve.*—Electrocardiography conveys valuable information concerning three of the main properties of cardiac muscle, viz. rhythmicity, excitability and conductivity. It does not give accurate information about the power of contractility. Accordingly the electrocardiographic record does not assess the functional capacity of cardiac muscle. As a matter of fact it is not infrequent to find a normal electrocardiogram in the presence of potential or actual heart failure. We have as yet no means of determining cardiac reserve, and electrocardiography seems definitely less reliable than clinical examination for such an assessment.

*Etiological diagnosis.*—Another important limitation is the fact that the ECG does not convey an etiological diagnosis. It is often only by inference from the existence of several specific patterns that it is possible to give a presumptive diagnosis. This diagnosis is valuable only when supported by clinical findings. Electrocardiography deals with disturbances in myocardial electrical conduction which are a facet of physiochemical alterations caused by various factors. These are not necessarily organic: they may be metabolic, endocrine, neuro-vegetative or emotional. Moreover, even in the presence of profound alterations presumptive of organic disease, it is not possible to tell from the ECG alone whether the damage is ischaemic, inflammatory or degenerative. The etiology is often presumptive, however, on account of the overwhelming frequency of coronary disease. It can be ascertained only by the integration of electrocardiographic information with the clinical survey.

*Specific patterns.*—There are several specific electrocardiographic findings, but generally there is no absolute specificity since several conditions may give the same pattern. Contrariwise, the "specific" patterns do not necessarily accompany the cardiac changes which are supposed to bring them about. For instance, the enlarged and notched P wave specific of mitral stenosis is not necessarily found in the presence of mitral disease. On the other hand, the mitral P may be a preliminary sign of left heart strain in aortic insufficiency, aortic stenosis or coarctation of the aorta. Again, it is widely known that serious angina pectoris may occur in the absence of electrocardiographic changes. This may not matter,

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since angina pectoris can often be diagnosed from the history. Much more disappointing is the fact that a normal ECG may be found after a cardiac attack heralding cardiac infarction. Accordingly a normal electrocardiogram, or one which shows no changes from an earlier tracing, is not necessarily reassuring, especially in the presence of a recrudescence of the clinical symptoms.<sup>2</sup>

**Normal standards.**—The limitations so far mentioned are inherent in the method. Others are caused by the still existing lack of knowledge about the tremendous amount of variation in what is called the normal ECG. In our opinion this is probably the main source of error in current electrocardiographic interpretation. Its cause is due, at least in part, to the fact that there are not as yet enough statistical studies of the normal electrocardiogram, especially so far as the unipolar leads are concerned. Such studies should include patients with significant positional changes, such as those caused by thoracic or pulmonary diseases, in whom cardiac disease is ruled out. It is essential to have an accurate knowledge of the range of normal values in the different leads in order to evaluate accurately borderline findings. These are often just "deviations from the mean," not included in the description of the standard normal ECG.

**Positional changes.**—It is often a difficult problem to differentiate the pattern due to alteration of the myocardium from a mere unusual position of the heart. Positional changes are definitely responsible not only for minor but also for some major changes in the form of the ECG. We shall discuss further a few of the misleading "deviations from the mean," ascribable to these changes.

### 1. LIMB LEADS

Inverted T waves in the aVL lead are not infrequent in the presence of a vertical, semi-vertical or even intermediate heart.<sup>4</sup> Q waves in the aVL lead occasionally may be larger than the R waves, especially with small narrow R deflections. This happens especially in vertical or semi-vertical hearts with total voltage of the QRS complex in aVL less than 5 mm. It has been suggested that such cases are associated with a posterior rotation of the apex of the heart so that both the right and left limb leads face the ventricular cavities.<sup>5</sup> Comparatively deep Q waves in the aVF lead are not uncommon. As a

rule they are associated with elevation of the diaphragm, and their depth varies with the respiratory movements. The *mean electrical axis of QRS* is much affected not only by rotation about the posterior-anterior axis, but also by rotation about the longitudinal and transverse axes, and it may therefore happen that too much importance is assigned to this information. The range of the normal electrical axis of QRS is very broad. In some cases a single deep inspiration may shift the axis through as much as 45°. Caution is required in making a diagnosis of left ventricular hypertrophy on the single evidence of a marked left axis deviation (except in very young subjects). On the other hand, significant right axis deviation suggests more definitely a right ventricular hypertrophy.

As combined rotation about the different axes may distort the form of the ventricular complexes, the assessment of the electrical axis may be irrelevant in some instances. This happens for example when large  $S_2S_3$  or  $S_1S_2S_3$  waves are recorded in the standard leads. This is a frequent finding in pulmonary emphysema, which causes a backward rotation of the apex of the heart. In this instance a "left axis deviation" will be diagnosed; this is nonsense, because emphysema is accompanied by a pendulous vertical heart and accordingly a right axis shift, masked by the deep S waves in leads 2 and 3.

The form of the record in lead 3 is often affected by the respiratory movements. It is well known that no special significance should be attached to the finding of an inverted T wave in lead 3. This holds true also for  $Q_3$  waves (no matter how deep) when no  $Q_2$  wave is present and there is no significant Q aVF. Deep  $Q_3$  waves are in fact often encountered in the presence of an elevated diaphragm, for example in some obese patients, in pregnancy,<sup>6</sup> ascites and pneumoperitoneum.<sup>7</sup>

In the presence of an isolated abnormality it is good practice to attempt a correlation of the findings in the standard leads with those in the corresponding unipolar leads. For instance, knowing that  $T_3 = T_{VF} - T_{VL}$  it will be readily realized that an inverted T wave in lead 3 may be caused not only by a negativity in aVF but also by a greater positivity in aVL.

### 2. PRECORDIAL LEADS

Small inverted T waves in the right precordial leads should also be cautiously interpreted. In-

verted T waves in leads  $V_1$  to  $V_4$  are normal in children, and may be normal in adults too, especially when there is no increase in depth from  $V_2$  to  $V_4$ .

V leads (unipolar) are now systematically preferred to bipolar leads. It has been demonstrated that in 5% of the cases there might be such a difference between the unipolar V leads and the bipolar CF leads as to change the interpretation of the record, and it is generally agreed that V leads reflect more accurately the development of the electrical phenomena. Nevertheless it has been found lately, and somehow against the current electrophysiological criteria, that in cases of myocardial ischaemia the CF leads yield a truer picture at times.<sup>9</sup> Pomerance *et al.* described 30 cases of unmistakable coronary disease in which the CF leads were diagnostic, while the simultaneous V lead tracings were mostly within normal limits.<sup>10</sup> The CF leads however have important limitations, as they have the tendency to exaggerate negative waves or to invert flat T waves. This may lead to "abnormal" T wave inversion in a normal vertical heart. Accordingly, they are to be recommended whenever a pattern with  $T_1$  lower than  $T_3$  is found. As false positive findings have also been recorded, the interpretation should always be made with the clinical findings.

*Extrinsic factors affecting the form of the electrocardiogram: positional changes.*—Some of the "pathological" electrocardiographic changes may be mimicked by functional disorders or by drugs. It is beyond the scope of this review to list factors such as sympathetic and vagal stimulation, and changes in electrolyte concentration or in acid base balance. The difficulties in interpretation related to positional changes will be emphasized. These may distort the record so as to make its interpretation embarrassing. They may be considered "extrinsic" factors inasmuch as they are not related to intrinsic properties of the cardiac muscle. As suggested by Johnston *et al.*,<sup>11</sup> it may be possible that, even in the presence of cardiac disease, abnormalities of the electrocardiogram are exaggerated, or on the contrary caused to disappear, by shifts in the position of the heart. Some of the borderline or false pathological patterns due to unusual rotation have been dealt with above. It is not currently taught that many of these changes are due to thoracic or pulmonary disease. Fibrosis, emphysema, mediastinal displacement and lung

collapse may cause important changes in the position of the heart as related to the thoracic cage, depending on the mobility of the mediastinal structures. Abnormal records are indeed comparatively common in the presence of chronic fibroid tuberculosis and after pulmonary collapse or exeresis. In some cases the changes mimic those of "myocardial damage." On the evidence of such signs Björkman asserted that tuberculosis produces "myocarditis."<sup>12</sup> It is permissible to suggest that most of the changes in T waves, described by this author and attributed to "tuberculous myocarditis," are merely positional. In a comprehensive study of 100 abnormal tracings from tuberculous patients, Fox *et al.*<sup>13</sup> evaluated only 4 records as being due to myocardial damage. The remaining 96 were ascribed to mediastinal shift and/or rotation.

Further, in the presence of a collapsed lung, a too rigid interpretation of the electrocardiogram may unduly deny to many a patient the benefit of surgery. Pulmonary collapse may be followed not only by shift in the transitional zone and by axis changes, but also by significant changes in the T waves, such as flattening or inversion. As stated by Hertzman and Mathisen,<sup>14</sup> even the electrocardiographic findings of a low or flat T wave in lead 1 should not be considered as indicating myocardial damage in evaluating for further surgery patients who have had collapse therapy.

Finally, in the presence of marked mediastinal shift to the left the precordial T waves may be flattened or inverted.<sup>15</sup> The same changes, associated with a left axis shift and deep Q waves in lead 3, may occur in pneumoperitoneum.<sup>7</sup>

In conclusion, the ECG of patients with pulmonary lesions must be interpreted with caution. It may be valuable in such cases to secure tracings in various positions and various respiratory phases.

#### SUMMARY

A review of some limitations in electrocardiographic interpretation is presented. It is asserted that these are due in part to the lack of correlation between the severity of disease and the degree of abnormality of the electrocardiogram. It is pointed out that the ECG gives only a hint as regards etiology and is of no value in assessing cardiac reserve.

The most important source of error in ECG evaluation seems to be the lack of knowledge of the range of variation of the normal ECG



brought about by changes in the electrical position of the heart. In the presence of thoracic or pulmonary disease, these changes are so important as to warrant a cautious evaluation.

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### PHYSICAL MEDICINE IN PRIVATE PRACTICE

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THERE IS AN INCREASING NEED to bridge the gap between the practice of the specialty of physical medicine and the practice of medicine as a whole. Recent advances in physical medicine have transformed old concepts of the care of trauma and chronic disease; this is being recognized more and more by public and profession, but application lags far behind our knowledge. The new methods of physical and occupational therapy, of disability evaluation and functional assessment, and of total rehabilitation have to be interpreted to the public, to doctors, nurses, hospitals, and government authorities. The methods have to be applied to individual patients in their own environment. Facilities with which to apply them have to be created. This job of interpretation and creation falls on the shoulders of the specialist in physical medicine (now called "physiatrist"). It is a challenge and an opportunity.

In Canada, most physicians who limit their practice to physical medicine are engaged in institutional work, and a career in private practice has been relatively unexplored. Yet, from the point of view of the community desiring adequate service for their disabled, the physiatrist in private practice may well serve their needs better than the physiatrist engaged full-time in institutional work. As a private practitioner, he will have close liaison with medical

colleagues and general hospitals, and his services can be shared among several institutions. He can speak as an independent agent to organizations requiring advice, or regarding the evaluation of disabled individuals. He will have personal, close contact with patients and their families at home and work. As for the practitioner, private practice will offer a richly varied clinical experience that will take him through almost every field of medical practice.

It is the purpose of this paper to describe the nature of the work involved in physical medicine on the basis of the writer's experience during the past year. The review may be helpful to practitioners who are contemplating a career in this new specialty.

The practice of physical medicine has three main components: (1) evaluation and treatment of conditions amenable to physical and occupational therapy; (2) diagnosis of neuromuscular function (electrodiagnosis, electromyography, functional assessment); (3) the work called "rehabilitation".

*Physical medicine in the community.*—Translated into the needs of a community for the services of a specialist in physical medicine, the practice of physical medicine breaks down into two main types: (1) part-time work in institutions; (2) consulting office practice.

1. *Part-time clinical and/or administrative work in institutions.*—The physiatrist who plans to hang up his shingle in a community will almost certainly require to have a part-time institutional appointment. He will need the physical medicine facilities provided by the institution for certain of his cases, and in most instances will need the assured basic salary; on the other

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hand, the institution with physical medicine departments will probably welcome the chance to obtain his services.

The type of institution varies with the locality, and the appointment may be clinical only or may include administrative duties. Institutions requiring physical medicine service include (a) universities; (b) those operated by Workmen's Compensation Boards and the Department of Veterans' Affairs; (c) general hospitals and their out-patient departments; (d) physical medicine centres operated by voluntary agencies; (e) rehabilitation units or centres for severely disabled (e.g., paraplegics, amputees, patients with severe neuromuscular or arthritic disabilities); (f) units or centres established for specific disabilities (e.g., cerebral palsy, multiple sclerosis, poliomyelitis, arthritis); (g) hospitals for convalescence, chronic disease, or the aged.

2. *Consulting office practice.*—For the private physiatrist, two problems will be outstanding, in addition to those confronting any specialist attempting to establish himself in a new location. These are (1) how to educate his medical colleagues, particularly on the type of case in which he can be of benefit; and (2) how to provide treatment for his patients.

The first problem will not be answered quickly. In many cases, personal contact—social and professional—is a necessary prerequisite to the conveying of information on the values of physical medicine. However, if the average busy practitioner is slow in altering his own established procedures in favour of the new techniques in physical medicine, he is also quick and keen to provide his patients with the best possible care. One aspect of practitioner education will thus be accomplished by the results of physical medicine, which will speak for themselves.

The second problem of treatment provision may, in some cases, be answered by referral to existing facilities, but I believe it will best be solved by the physiatrist's establishing private treatment facilities. He will need his own office for those patients who work during the day and require treatment in the evenings, at a time when most out-patient departments are closed. Also, at his own office he will have an unrivalled opportunity of observing the response of his patients to treatment, and of improving his techniques. Elaborate equipment is, of course, not essential for the dispensing of good physical therapy.

3. *Other types of activity.*—In addition to institutional and consulting practice the physiatrist will probably be concerned in three other types of activity: (a) creating new physical medicine departments; (b) participating in the work of committees, hospital staffs, and lay organizations dealing with medical and social rehabilitation; (c) lecturing on physical medicine topics to doctors, nurses, and lay groups.

#### PRACTICAL EXPERIENCE IN PRIVATE PRACTICE

To illustrate more clearly the work involved in establishing a private practice, I have reviewed my experiences during the past year in an industrial area of 140,000 population.

*Part-time appointments.*—Part-time appointments were obtained at (1) a cerebral palsy centre and physical medicine out-patient centre operated by a voluntary agency; (2) a hospital for chronic disease and the aged, where I had to create a new physical and occupational department; (3) the acute poliomyelitis hospital.

*Consulting office practice.*—Consulting and treatment offices were rented and equipped. Arrangements were made for the part-time services of a physiotherapist for evening work only. Treatment equipment was simple and included short-wave and infra-red machines, wax (heated in a modified broiler), resistance circuits, traction circuit, a faradic-galvanic machine, and two plinths. The treatment office has operated quite successfully.

*Creating new department.*—In this connection, it may be worth mentioning the useful and practical information available from the American Physical Therapy Association and the American Council on Physical Medicine and Rehabilitation. Their advice was freely given and most helpful.

*Committee work.*—During the past year I participated in the following committees: (a) Red Cross; (b) Cerebral Palsy Parents Association; (c) Muscular Dystrophy Association; (d) Placement of the Handicapped Committee; (e) Senior Citizens Committee; (f) Rehabilitation Survey, and (g) Crippled Children's Committee. This encroached on one's spare time, as does lecturing; it is, however, in my opinion, a part of the work of a specialist in physical medicine, and a responsibility that should not be neglected.

*Postgraduate work.*—The rapid developments in all aspects of physical medicine make postgraduate study essential, and in this regard the



Ontario Society for Crippled Children is most helpful and co-operative.

*Negotiations with insurance plans.*—There is at present little precedent to guide medical insurance plans on fee schedules and frequency of visits required in physical medicine practice. It was necessary to discuss these matters in some detail with a local medical insurance scheme before joining as a participating specialist. The Workmen's Compensation Board of Ontario is at present studying their payment schedules for prescription and medical supervision by a physiatrist, and principles and details relating to private physical medicine practice have yet to be established with them. Such negotiations may be regarded as the "growing pains" attendant on the practice of a relatively new specialty.

#### CONSULTING OFFICE PRACTICE— STATISTICAL ANALYSIS

The files of 150 private cases are reviewed below to show source of referral, place of consultation, age group, diagnosis, and place of reference for treatment.

More than two-thirds of the patients were referred by physicians.

TABLE I.

SOURCE OF REFERENCE	
From Physicians.....	68.0%
Public.....	19.2%
Poliomyelitis hospital.....	11.6%
Chiropracist.....	1.3%

Most patients were seen at the office. Only 6% had to be seen at their homes.

TABLE II.

PLACE OF CONSULTATION	
Office.....	68.0%
General hospital.....	14.6%
Poliomyelitis hospital.....	11.3%
Patient's home.....	6.0%

All age groups were represented, and one in five were children.

TABLE III.

AGE GROUP	
Under 16 years.....	19.6%
Over 60 years.....	11.0%

The conditions seen most frequently, in order, were neuromuscular, arthritic, and orthopaedic disabilities.

TABLE IV.

DIAGNOSIS	
Congenital disabilities.....	2.6%
Fractures and postoperative.....	12.7%
Soft tissue (trauma and fibrositis).....	15.3%
Intervertebral disc lesions.....	3.3%
Arthritis.....	20.0%
Degenerative.....	16.0%
Rheumatoid.....	3.3%
Septic.....	0.7%
Neuromuscular.....	39.4%
Upper motor neurone.....	12.0%
Lower motor neurone.....	26.7%
Muscular.....	0.7%
Miscellaneous.....	6.7%

Variation in the place of reference for treatment depended on such factors as times of work, need for occupational therapy, and patient preference. Over one-third could adequately be treated at private consulting or treatment office.

TABLE V.

PLACE OF REFERENCE FOR TREATMENT	
Out-patient department.....	34.7%
Treatment office.....	25.3%
Consulting office (exercise therapy).....	12.0%
Patient's home programme.....	8.0%
General hospital.....	5.3%
Chronic disease hospital.....	4.0%
No treatment required.....	10.7%

#### SUMMARY

Private practice in the specialty of physical medicine—opportunities and general problems—is discussed.

The nature of the work, type of case referred to consulting office, and method of arranging for treatment are reviewed on the basis of the author's experience.

The field is comparatively new, is vast, and demands something of the pioneering spirit. In return, there is offered a richly varied and satisfying medical career.

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#### LIFE INSURANCE MEDICAL RESEARCH FUND

The 1953-54 Annual Report of the Life Insurance Medical Research Fund (345 East 46th St., New York 17, N.Y.) is a report of further work done on cardiovascular disease by research workers supported by the Fund. During the past year, 97 institutions have benefited from grants aiding research programmes, with arteriosclerosis and hypertension the chief objects of study.

FOLLOW-UP STUDIES IN  
CARDIOVASCULAR SYPHILIS\*FREDERICK KALZ, M.D. and  
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THE UNDERSTANDING of a disease demands a knowledge of its natural history. Controversy still surrounds the true course of cardiovascular syphilis and, in consequence, one cannot adequately assess the prognosis of treated and untreated patients with this disease. We agree with the following statement which appeared in a recent article: "Extraordinary as this may sound, the enormous world literature on the prognosis and the effect of treatment in cardiovascular syphilis is, with few exceptions, of little value."<sup>1</sup> By the application of more rigid criteria in the selection and evaluation of their available material some of the recent clinical investigators have succeeded in answering a few of the questions under discussion. But, in so doing, they have invalidated many of the conclusions considered to have been established firmly by earlier authors.

Contradictory statements have resulted from failure to take into account several features.

1. Usually cardiovascular syphilis has been considered as a single disease entity, while, in point of fact, the course of the disease depends upon the localization of the pathological process within the cardiovascular system and the consequent disturbance of circulatory function.

2. Many reports tend to neglect the degree of pathological change as well as the extent of resulting abnormal function, whilst few consider the point at which treatment interrupts the development of the disease.

3. The prognosis of cardiovascular syphilis is influenced to a variable extent by such factors as race, sex, age at onset of symptoms and at initiation of therapy, the occupation of the patient, and his general state of health, as well as the coexistence of other diseases, most particularly the presence of arteriosclerosis, and occasionally bacterial endocarditis.

4. Case reports have been evaluated retrospectively in most series published; the information was obtained from old case histories based on the examinations and notes of generations of

changing physicians. It is manifestly preferable to undertake a long-term study with definite objectives in mind.

5. A proper follow-up system is lacking in the majority of papers published. In some instances as many as 50% of the cases have been reported as "lost from observation", and even in a few of the more carefully documented series only 85% of the initially listed patients were followed up. These "lost patients" have usually been omitted from the further evaluation of the group, thereby introducing another source of inaccuracy.

Sufficient evidence exists to indicate that antisypilitic therapy influences beneficially the prognosis of cardiovascular syphilis.<sup>2, 3</sup> Assuming this to be true, it is felt that detailed studies of the life expectancy and the general prognosis of adequately treated patients should be of practical value. We are here reporting, therefore, on a series of 111 patients examined and treated prior to the year 1948, whose subsequent course has been followed up to the year 1954. Forty-six patients of this group died during the follow-up period; and of the survivors, 63 have been followed for over 5 years and 37 over 10 years. All patients with cardiovascular syphilis seen at the syphilis treatment centre in the out-door department of the Royal Victoria Hospital in Montreal have been included in this series, with the exception of those cases in which an accurate diagnosis could not be determined because of a clinically insoluble combination with other cardiac disease.

Among the 111 patients were 73 men and 38 women; 100 were of the white race, 7 were Negroes, and 4 Chinese.

The average age of the men was 57 years; of the women, 46 years when first seen. Four of the patients were in their fourth decade, three were over 70 years when their diagnosis was made and therapy was begun, and the remainder were between the ages of 40 and 60 years.

Of this series only two patients\* were lost to observation. Two factors made this satisfactory record possible: (1) sufficient clinic personnel, including a full-time secretary and a social service worker;† and (2) a relatively static, middle-aged population.

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\*The two cases lost (due to the disappearance of their case records) have been omitted from tabulation, thereby reducing the total number of patients to 109.

†Provided by a long-term grant from the Ministry of Health, Province of Quebec.



# DIAGNOSTIC CRITERIA

The following diagnostic criteria were used in the classification employed in Tables I to IV.

## 1. Uncomplicated Aortitis

(a) An accentuation of the aortic second sound in the absence of hypertension.

(b) An aortic systolic murmur in the absence of a mitral lesion or hypertension.

(c) Evidence of widening of the ascending aorta in the x-ray film or by fluoroscopic examination.

The presence of at least two of these signs was required for the diagnosis to be made. All patients of this group had initially positive serological reactions for syphilis. In addition the heart was not enlarged in these cases, and the electrocardiograms were all within normal limits. A nocturnal, dull, retrosternal pain was present in a few of these patients, but angina of effort was not considered compatible with the diagnosis of uncomplicated aortitis and patients with a diagnosis of angina were listed under the heading of aortitis complicated by coronary artery disease.

## 2. Aortitis with Simple Aortic Insufficiency

Simple aortic insufficiency was diagnosed in patients with aortitis who had developed the clinical evidence of aortic insufficiency in the absence of any signs or symptoms indicative of coronary artery disease or congestive failure. Although in a few cases there was a moderate cardiac enlargement, this did not progress whilst under observation. With this single exception the electrocardiographic and radiological findings were normal. Among the patients a few showed a slightly lowered threshold of dyspnoea on exertion.

## 3. Aortitis Complicated by Coronary Artery Involvement

This diagnosis was made on those patients with syphilitic aortitis who had signs and symptoms indicative

of insufficiency of the coronary circulation, and included all patients with that complex. Thus no attempt was made clinically to differentiate those cases due to syphilis from those due to other causes—coronary sclerosis. Angina of effort was the chief diagnostic evidence, although they also presented a markedly lowered threshold of exercise tolerance as regards dyspnoea. All patients showed electrocardiographic signs of impairment as well, but the principal criterion was a clinical one.

## 4. Aortitis (or its Sequelæ), Complicated by Congestive Failure

All patients with syphilitic aortitis and evidence of congestive failure at the first examination were included in this group. It is realized that there have been unavoidably included in the last two groups patients with coronary artery disease and congestive failure in which the syphilitic lesion does not play an etiological role. An exact differential diagnosis is often impossible, and it is suggested that the prognosis is not much influenced by the question of the etiological factors.

## 5. Aortitis, Complicated by Saccular Aneurysm

Included in this group are all patients with the clinical and roentgenological evidence of a saccular aneurysm of the aorta, in its ascending portion, the arch, or the first part of the descending aorta. Two patients had saccular aneurysms involving the innominate artery in one, near its origin, and the left common carotid artery, also near its origin, in the other.

## 6. Aortitis, with Multiple Complications

Patients with evidence of the presence of two or more complications of cardiovascular syphilis were listed under the heading of the more serious disorder. Thus, patients with aortic insufficiency together with evidence of coronary artery disease or of a saccular aneurysm have been included in one of these two latter groups. All patients initially seen in congestive failure were grouped under this heading, regardless of the pathological changes which existed as their background.

TABLE I.

SURVIVAL IN CARDIOVASCULAR SYPHILIS

Diagnosis	No. of cases	Cause of death		Average age at time of death (years)	Average survival time (months) after therapy (in cases of cardiac death)
		Cardiac	Non-cardiac		
Aortitis (uncomplicated).....	38	0	4	70	—
Aortitis (with hypertension).....	8	0	4	67	—
Aortitis (with aortic insufficiency).....	19	3	5	68	90
Aortitis (with coronary artery disease).....	11	6	1	60	37
Aortitis (with congestive failure).....	14	8	1	60	23
Aortitis (with aneurysm).....	19	11	3	53	52
All diagnoses.....	109	28	18		

1. No cardiac death occurred in the group of uncomplicated aortitis.
2. Hypertension did not detectably alter the prognosis of those patients with aortitis as well.
3. Although three cardiac deaths occurred in the group with aortic insufficiency, the life expectancy of this group did not differ statistically from that of the cases of uncomplicated aortitis.
4. The presence of the signs and symptoms indicative of coronary artery disease significantly altered the prognosis: the patients died at an earlier age, the survival after the initial examination was less, and there was a high percentage of cardiac deaths.
5. The presence of cardiac failure at the first examination eventuated in findings similar to those seen with coronary artery disease, with rapid deterioration in health.
6. In those patients with an aortic aneurysm, the latter was the cause of death in a high percentage of cases, although the clinical course was somewhat slower than that seen with coronary artery disease.

TABLE II.

THE FREQUENCY AND CAUSE OF DEATH BELOW AND ABOVE 60 YEARS					
Age group	Diagnosis	Number of cases	Number of deaths	Causes of death	
				Cardiac	Non-cardiac
Under 60 years of age	Aortitis, uncomplicated . . . . .	21	1	0	1
	with aortic insufficiency . . . . .	6	3	0	3
	with coronary artery disease . . . . .	2	1	1	0
	with cardiac failure . . . . .	8	6	6	0
	with saccular aneurysm . . . . .	10	10	8	2
Over 60 years of age	Aortitis, uncomplicated . . . . .	25	7	0	7
	with aortic insufficiency . . . . .	13	5	3	2
	with coronary artery disease . . . . .	8	6	5	1
	with cardiac failure . . . . .	7	3	2	1
	with saccular aneurysm . . . . .	9	4	3	1

This table illustrates the fact that cardiac death did not occur under the age of 60 in those patients with uncomplicated aortitis or aortic insufficiency (simple).

#### 7. Aortitis, Associated with Hypertension

Initially in this study we separated from the main group those patients with aortitis who also had hypertension, but, as will be noted in the comments made on this subject, we subsequently listed them as a part of the classification of simple aortitis.

#### THERAPY

All patients received therapy. Our routine therapy before 1948 consisted of 40 arsenical (Mapharsen 0.06 gm.) injections and 40 bismuth injections (bismuth subsalicylate 2 c.c. once weekly). Treatment was always started with bismuth and the dosage of Mapharsen was re-

duced in some cases. After 1948, penicillin in oil with aluminium stearate was given routinely, 900,000 units twice weekly to a total dosage of 4,500,000 units. Patients with an associated neurosyphilis received additional treatment, either in the form of fever therapy or of a higher dosage of penicillin.

#### COMMENTS

It was the purpose of this study, which was started in 1939, to follow carefully over a period of time the fate of all our patients with cardiovascular syphilis treated in the out-door de-

TABLE III.

THE FREQUENCY AND CAUSE OF DEATH IN THE POST-THERAPY PERIOD					
Diagnosis	No. of cases	Number of years after therapy	Number of deaths	Cause of death	
				Cardiac	Non-cardiac
Aortitis, uncomplicated . . . . .	46	Under 1 year	0	0	0
		1 - 5 years	4	0	4
		5 - 10 years	2	0	2
		10 - 20 years	2	0	2
Aortitis, with aortic insufficiency . . . . .	19	Under 1 year	2	0	2
		1 - 5 years	2	2	0
		5 - 10 years	1	0	1
		10 - 20 years	3	1	2
Aortitis, with coronary artery disease, or congestive failure . . . . .	25	Under 1 year	5	5	0
		1 - 5 years	8	7	1
		5 - 10 years	1	1	0
		10 - 20 years	2	1	1
Aortitis, with saccular aneurysm . . . . .	19	Under 1 year	0	0	0
		1 - 5 years	10	8	2
		5 - 10 years	2	2	0
		10 - 20 years	2	1	1

This table demonstrates the high percentage of cardiac deaths which occurred in the early years after therapy was given to those patients who, at the initial examination, presented evidence of coronary artery involvement or cardiac failure.



TABLE IV.

COMPARISON OF SURVIVAL OF THE SYPHILITIC AND NON-SYPHILITIC POPULATION				
Follow-up period	Diagnosis	No. of cases in group	Percentage of survivals	
			Actual (in our group)	Predicted (in a corresponding age group of city population—Montreal)
5 years	Aortitis, uncomplicated . . . . .	46	91.3	92.1
	with aortic insufficiency . . . . .	19	80.1	89.2
	with coronary artery disease . . . . . with cardiac failure . . . . . with saccular aneurysm . . . . .	44	61.3	93.2
10 years	Aortitis, uncomplicated . . . . .	32	87.5	84.3
	with aortic insufficiency . . . . .	14	92.8	78.6
	with coronary artery disease . . . . . with cardiac failure . . . . . with saccular aneurysm . . . . .	30	40.0	83.3
15 years	Aortitis, uncomplicated . . . . .	12	100.0	83.3
	with aortic insufficiency . . . . .	9	88.9	77.8
	with coronary artery disease . . . . . with cardiac failure . . . . . with saccular aneurysm . . . . .	16	31.2	56.2

The life expectancy of each of our patients was calculated in comparison with the figures issued by the Office of Vital Statistics in Ottawa for the Island of Montreal.

Two striking facts are demonstrated: 1. There is no impairment of the life expectancy of those patients suffering from uncomplicated aortitis or of those with aortic insufficiency (simple). 2. There is a marked reduction in the life expectancy of those patients with complicated cardiovascular syphilis.\*

\*The possibility that the difference in life expectancy between the group with simple aortic insufficiency and the group with complicated cardiovascular syphilis is a chance finding was calculated as less than 1:1,000. We are indebted to Dr. Slatkin, Department of Genetics, McGill University, for this mathematical evaluation.

partment; that is, to list all the clinical features such as the progression of symptoms and the development of complications, and to determine as closely as possible the cause of death in those patients who died under our observation. We did not attempt to evaluate the merits of various treatment schemes and for obvious reasons no untreated comparable control series was available. In 39 of these patients a concomitant neurosyphilis led us to modify the treatment scheme, but in these patients, most of whom showed for the most part only asymptomatic involvement of the central nervous system, the prognosis did not differ from that of the general group.

It has been suggested that all fatalities occurring during the first year after completion of therapy should be disregarded; this is justified only if the results of treatment are being considered, but it is not indicated if the life expectancy is being calculated.

We have omitted from our tables any data on sex, race, or age distribution since no relative correlations could be established in this small series.

No cardiac death occurred in the group of 38 patients with uncomplicated aortitis; this suggests that the life expectancy in these cases is not significantly altered from that seen in their counterparts in the general population. Similarly, in the eight cases of aortitis associated with hypertension, none of the four deaths was attributable to the cardiovascular syphilis present. Thus whilst initially we included patients with this syndrome in addition to their aortitis in a distinct group, we subsequently discovered that the presence of hypertension did not appear to alter the prognosis in patients with aortitis from that seen in the remainder of their number, and accordingly those cases with hypertension were considered with the patients with simple aortitis alone.

Only one death in the group of simple aortic insufficiency could be attributed to cardiovascular syphilis, although there were three cardiac deaths. One occurred at the age of 74, with the characteristic signs and symptoms of acute coronary occlusion. Another occurred 17 years after the case was diagnosed and treated, at the age of 64; and only one death, due to congestive

failure, could be reasonably attributed to syphilis.

We have been particularly impressed by the absence of clinical progression, the relatively favourable course, and the normal life expectancy of our treated patients with aortic insufficiency in the absence of signs of coronary artery disease. Whilst aortic insufficiency is admittedly a progression in the pathological development of aortitis, it did not, in its simple form, appear to serve as an indication of a poorer prognosis than simple aortitis, and consequently these cases were listed separately from that group in which the diagnosis was complicated by coronary artery disease or congestive failure. These latter appeared to follow the ultimate prognoses associated with these complications as seen in the general medical group, and have, in the tables, been included under the heading of complicated cardiovascular syphilis. The observation that the life expectancy in cases of simple aortic insufficiency seemed to be the same as that of the average of the population is at variance with the accepted teaching of the dangerous nature of this disorder. The discrepancy is probably explained by our diagnostic criteria. As mentioned above, we listed those patients with aortic insufficiency and angina of effort or other indication of narrowing of the coronary ostia under the heading of coronary artery disease rather than under aortic insufficiency. Webster, Densen *et al.*<sup>1</sup> found an approximate survival rate of 48% in their series for those patients who were free of symptoms at the time of diagnosis, while only 6% of those with anginal symptoms or signs of cardiac failure survived the ten-year period. Woodruff<sup>4</sup> noted an incidence of over 50% for coronary ostial stenosis in the post-mortem examination of 41 cases of cardiovascular syphilis, a figure considerably higher than that mentioned in most textbooks. It is, then, our belief that the *presence or absence of coronary artery disease is the chief determinant of the prognosis in cases of aortic insufficiency.*

In agreement with most observers, we confirmed the poor prognosis of those patients who have cardiac failure when first seen, irrespective of the underlying pathological changes then present and the amount of therapy subsequently given.

Saccular aneurysms terminated in rupture in over 30% of cases. This suggests that therapy may be of little value in those cases in which the

pathological changes are already well established, and the destruction of the vessel wall far progressed, at the time when the patient is first seen.

The classification of cardiovascular syphilis merits some discussion in this connection.

The conventional clinical divisions have been presented under the following headings: (1) Uncomplicated aortitis. (2) Aortic insufficiency. (3) Ostial stenosis. (4) Saccular aneurysm. (5) Diffuse syphilitic myocarditis. (6) Gumma of the myocardium.

Eisenberg<sup>5</sup> suggested the more accurate pathological division: (1) Aortitis, uncomplicated. (2) Aortitis, complicated by one or more of the following: (a) Aortic insufficiency. (b) Saccular aneurysm. (c) Ostial stenosis.

From the clinical and prognostic point of view, the following classification is presented as being useful:

(a) Aortitis, uncomplicated.

(b) Aortitis complicated by simple aortic insufficiency (i.e., without the signs of coronary artery disease or congestive failure).

The prognosis, if therapy is given, is favourable in both (a) and (b) groups.

(c) Aortitis, complicated by coronary artery involvement (to include cases both with and without aortic insufficiency).

(d) Cardiovascular syphilis, with congestive failure (to include all cases with failure regardless of the underlying pathological changes).

The prognosis is unfavourable in groups (c) and (d) regardless of the therapy given.

(e) Saccular aneurysm.

The prognosis depends on the degree of pathological change present at the time of initial therapy as well as the status of the coronary circulation.

#### SUMMARY

1. One hundred and eleven patients with various forms of cardiovascular syphilis have been treated and their subsequent course followed; 84 have been observed for at least 5 years, 53 for 10 years, and 25 for 15 years. There was a total of 46 deaths.

2. No patient with uncomplicated aortitis died from causes attributable to his cardiovascular syphilis. The life expectancy of this group did not differ from that of the general population.

3. Only one patient with aortic insufficiency, of those uncomplicated by coronary artery dis-



ease or congestive failure when first seen, died from causes attributable to his cardiovascular syphilis. The life expectancy of this group was not statistically altered from that of the general population.

4. The life expectancy of those patients who displayed signs and symptoms referable to an impairment of the coronary circulation was considerably reduced regardless of the degree of coexistent disease of the aorta.

5. Patients with cardiac failure when initially seen showed a mortality rate similar to that seen with coronary arterial involvement.

6. The figures submitted suggest that it is the presence or absence of coronary arterial involvement that is the determinant prognostic factor, whilst the existence of aortic insufficiency is of much less importance in adequately treated patients.

7. It is therefore suggested that the diagnostic heading "aortic insufficiency" as at present used, comprising both those cases with coronary artery involvement and those without, should be abolished.

8. It would be more realistic to group all those cases with such coronary artery involvement under the single heading of "aortitis with

coronary artery involvement," irrespective of the presence or absence of aortic insufficiency.

9. Similarly, it is suggested that all cases of cardiovascular syphilis with evidence of congestive failure at the initial examination should be classified under the single heading of "cardiovascular syphilis, with congestive failure," regardless of the underlying type of syphilitic pathological changes, since it is the presence or absence of congestive failure which manifestly governs the prognosis in these cases.

10. The study would seem to suggest that, once the pathological alteration of a saccular aneurysm has been established, treatment does not alter the progress of the lesion or the frequency of rupture as a complication.

11. A diagnostic classification of cardiovascular syphilis has been submitted, based on the findings of this study as regards the clinical course and prognosis of the disease.

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## THE SURGICAL TREATMENT OF CANCER OF THE HYPOPHARYNX\*

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I PROPOSE TO CONFINE this paper to the surgical treatment of cancer of the hypopharynx. One should consider cancer of this area under two separate headings: firstly, the postcricoid tumours, extending in many cases into the cervical œsophagus; secondly, those tumours originating in the pyriform fossæ. These two groups of cases present rather different clinical pictures although the surgical techniques at present available for their cure are almost identical. I am only going to describe patients who have been operated on

in the Ear, Nose and Throat Department at the Radcliffe Infirmary, Oxford, by Mr. Macbeth, Mr. Livingstone or myself. My terms of reference necessitate exclusion of tumours originating in the cervical œsophagus below the cricopharyngeus. I have also excluded the extrinsic laryngeal carcinomata, for example, those arising from the aryepiglottic folds, because they call for a different type of surgical treatment.

I merely mention in passing the treatment of these types of cancer by radiotherapy because I want to confine my observations to our own experiences and we have up to now been unable to offer anything more than short-term palliation to our patients who for one reason or another are to be treated solely by radiotherapy. This is in sharp contradistinction to our experiences with radiotherapy in the treatment of cancer of the oropharynx, where we have had some very good results.

In the postcricoid group (Table I), of which we have 11, all our patients have been women

\*Presented at the Annual Meeting of the Canadian Otolaryngological Society, Harrison Hot Springs, B.C., June 1954.

†Exchange Fellow, British Empire Cancer Campaign.

TABLE I.

CANCER OF THE HYPOPHARYNX		
<i>Sex</i>	<i>Post-cricoid All women</i>	<i>Pyriform fossa All men</i>
Number of operations.....	11	17
Age.....	62 to 74 years	47 to 79 years
Local metastases...	Rare	Frequent

and, with one exception, have been between the ages of 62 and 74. The clinical picture of these patients is well known. There is a long history of mild dysphagia, eventually becoming extremely severe and then accompanied by evidence of marked malnutrition. We believe that nearly all these patients have originally suffered from chronic hypopharyngitis associated with iron deficiency anaemia. To begin with we made the mistake of proceeding to major surgery as soon as possible after the diagnosis and suitability for operation had been confirmed. We now feel that the postoperative morbidity and mortality are lessened if a preliminary gastrostomy is performed and the patient is fed by this route for a week or ten days before proceeding to surgical removal of the cancer. Only two of our patients with postcricoid cancer had palpable cervical lymph nodes when they came to us, and for these we performed a radical neck dissection at the same time as we removed the primary tumour. In one or two cases cervical metastases developed a year or so after the primary had been removed, and they had a radical neck dissection when it became necessary. We have come to accept as a fact that local metastases in postcricoid carcinoma are on the whole infrequent and we do not feel that it is necessary to do anything in the way of a so-called prophylactic neck dissection.

In our group of pyriform fossa tumours all the patients have been men and the age incidence has been considerably wider, varying from 47 to 79 years. We have operated on 17 patients in this group. Nearly all have had clinical involvement of the cervical lymph nodes at the initial examination. In a striking number this has been the only complaint. Because of the early metastases to the regional lymph nodes we now combine a radical neck dissection with the surgical removal of the primary whether or not the lymph nodes are clinically invaded. In a few of our earlier cases we did not do this and have been obliged to perform radical neck dissection

within a few months of removal of the primary. The general physical state of the patients with pyriform fossa tumours is usually better than most of the postcricoid group because extreme dysphagia and consequent malnutrition is exceptional. For this reason we do not, as a rule, wait to perform preliminary gastrostomy.

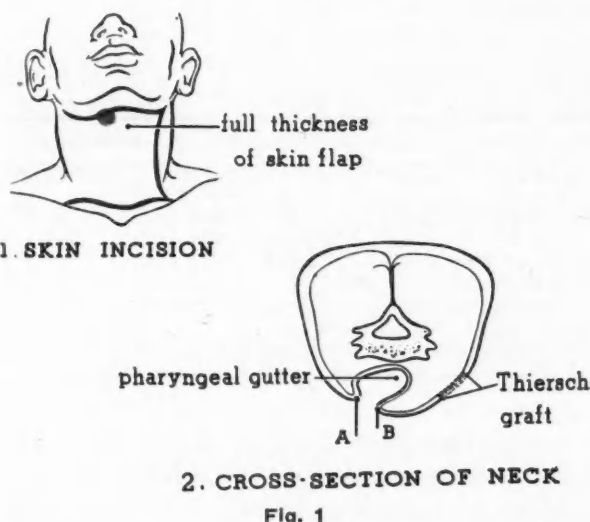
Before mentioning the various operative techniques I would like to make a general statement on what one might call the philosophical attitude of the surgeon who has to deal with this type of cancer. These patients are often of an advanced age, in fact under normal circumstances they may have only four or five years of life left to them. It is therefore only logical to make their length of stay in hospital commensurate with their natural life expectancy. In other words, a patient who has only five years of life left to him should not be expected to spend months of that time in hospital undergoing elaborate staged operations. As a corollary, no surgical technique can be said to have achieved its object if it is followed by a benign fibrous stricture which necessitates repeated admissions to hospital for dilatation and bouginage.

With the exception of one of the postcricoid group and three of the pyriform fossa group, all these patients were subjected to pharyngolaryngectomy. This makes a total of 24 patients. This operation presents to my mind as two separate problems. Firstly, is complete removal of the cancer possible? Secondly, by what method is the pharynx to be reconstructed? In the case of the patient with a pyriform fossa tumour we believe that complete removal of the cancer necessitates a simultaneous radical dissection of the regional lymph nodes. It is sometimes also necessary to remove the lobe of the thyroid on the affected side. The postcricoid tumour tends not only to invade the thyroid gland but also to spread down the oesophagus. The thyroid invasion can easily be dealt with by total thyroidectomy, but the oesophageal extension can make operation impossible if it continues too far into the thorax. One can, of course, mobilize the thoracic oesophagus a little and pull it up into the neck, but even the most thorough mobilization can only give you an extra inch or inch and a half of oesophagus to work with. I have seen a patient who was operated on by Dr. R. A. Mustard of Toronto, the inner end of the clavicle and part of the sternum being removed to give a better ap-



proach to the lower end of the tumour. I have, however, no personal knowledge of this excellent addition to the operative technique. The most tiresome aspect of this oesophageal extension seems to me to be the fact that one does not get a great deal of information as regards the lower limit of the tumour by preoperative barium swallow radiography. Quite often the patient cannot swallow the barium at all. Soft-tissue lateral radiographs may be helpful, but the lower limit of the carcinoma may be obscured by the shadow of the clavicle. It is therefore usually necessary to begin the operation with an exploration of the oesophagus to see whether it is possible to get a reasonable distance below the tumour. In one of our patients

### WOOKEY FLAP METHOD



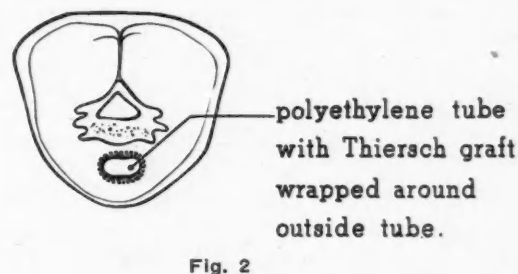
it was only with great difficulty that we got the cut end of the oesophagus sutured to the reconstructed pharynx and after a few days these stitches cut out and the oesophagus retracted out of reach into the chest. This patient lived for many months with a gastrostomy, but she insisted on our attempting to restore the normal continuity of her food channel and eventually died as an outcome of this operation. Looking back on the case, we should probably have abandoned the loose oesophagus and constructed an extrathoracic oesophagus from the skin of the chest wall.

With regard to the problem of reconstruction of the pharynx we have tried three methods and like most of our colleagues have not been entirely happy with any of them. In our earlier

cases we used the skin flap method with which Dr. Wookey of Toronto has produced such excellent results. The upper diagram shows the skin incision employed to produce the flap and the lower cross-section shows the flap placed in position to form a pharyngeal gutter. This gutter is continuous with the oropharynx above and the oesophagus below. The dotted line represents a Thiersch graft put in to restore the continuity of the skin of the neck. After a few weeks, when the wound is well healed and the blood supply of the flap is re-established, the pharyngostome is closed by vertical incisions at the points A and B. Two things worried us about this method and we made one mistake in technique which may have accounted for them.

### THIERSCH GRAFT METHOD

1. ANY SKIN INCISION MAY BE USED PROVIDED THAT IT GIVES ADEQUATE APPROACH TO THE OPERATIVE FIELD.
2. CROSS SECTION OF NECK.



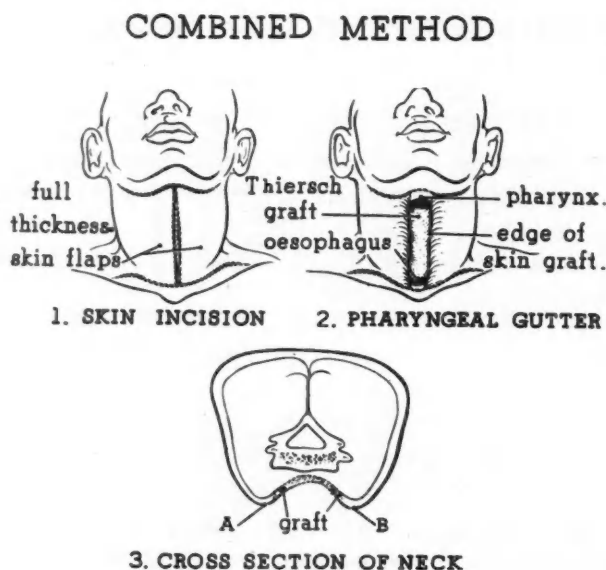
Firstly, we had to wait at least five weeks before we could close the pharyngostome; secondly, we had a good deal of trouble with fistula formation after closure. These fistulas always closed in time but it seemed to us that there should be a quicker method. The mistake that we made was in getting the skin of the other side of the neck sewn together at the expense of the flap. Now that I have had the opportunity of seeing Dr. Wookey do some of this surgery I can see how serious this omission was.

We then turned, as did many others, to the technique of using a skin graft to reconstruct the pharynx. In this method a large Thiersch graft is wrapped completely round a suitably shaped polyethylene tube. One end of this tube is placed in the pharynx and the other end is pushed a

little way into the œsophagus. The skin of the neck is closed completely and no second operation is necessary. After a few weeks the graft will completely bridge the gap between the pharynx and œsophagus and the polyethylene tube can be removed through the mouth. This method presented its problems, but we did manage to get our patients out of hospital in a much shorter time, usually in about four weeks. All except one of them had to be readmitted again and again for dilatation of a fibrous stricture which would appear at the junction of the lower end of the graft and the upper end of the œsophagus. Apart from the inconvenience to the patients these strictures caused us a lot of personal mental trauma. For one thing they are a

wall as part of the first stage of this operation. Healing and re-establishment of the blood supply takes a maximum of four weeks by this method. The pharyngostome is then closed by vertical incisions at the points A and B in the third diagram. The pedicle graft is also at hand if it is required for bridging any skin deficiency of the neck. In our hands this method has not led to stricture formation at the œsophagopharyngeal junction. The interval between the first and second operations has been shorter than when we were using the Wookey flap method.

Finally, I have to put before you our results in these 24 cases. I am not proud to do so, but the object of this paper is not to show a wonderful series of surgical cures, but rather to bring to your attention a field of ear, nose and throat work where there is a future for those who are interested in improving and developing surgical techniques.



little tricky to dilate and for another thing one is never quite sure that the stricture is purely benign and is not due to recurrence. One of these patients worried us so much that we excised the skin tube and used a combination of the Wookey flap method and a pedicle graft to make another pharynx for her.

Thirdly, we have developed a technique which involves the use of both skin flaps and a Thiersch graft. The upper diagram shows the necessary skin incisions. After removal of the pharynx and larynx the skin flaps are sewn down to the pre-vertebral fascia as shown in the second diagram. The gap between the two flaps is then filled in by a rectangular Thiersch graft which is the floor of the pharyngeal gutter. A pedicle graft is fashioned from the skin of the anterior chest

TABLE II.

24 PATIENTS TREATED BY PHARYNGO-LARYNGECTOMY			
Alive and well after.....	<div style="display: inline-block; vertical-align: middle;">           4 years 3 years 2 years         </div>	<div style="display: inline-block; vertical-align: middle;">           3 2 4         </div>	<div style="display: inline-block; vertical-align: middle;">           } = 37.5%         </div>
Alive and well at less than 1 year.....		1	= 4.0%
Died as result of the operation.....		9	= 37.5%
Local recurrence and death within 1 year		3	= 12.5%
Died 1 year later of other causes.....		1	= 4.0%
Died 4 years later (cause unknown).....		1	= 4.0%

You will see from Table II that as many patients died as a result of the operation as have survived two years and over. I have tried to point out the causes of the operative deaths as we went along. I think that they may be summed up briefly as being due to: (1) inadequate preparation; (2) faulty operative techniques. The local recurrences have up to now all taken place within a year, so it is hoped that those nine patients at the top of the table who are alive and well after periods from two to four years are not going to develop local recurrences.

I wish to thank Dr. Percy Ireland of Toronto for his helpful criticism. I also wish to thank Mr. Macbeth and Mr. Livingstone for permission to publish their cases. I will always be grateful to the British Empire Cancer Campaign and the Canadian Cancer Society for making possible my visit to Canada.

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## THE MEDICAL MANAGEMENT OF RHEUMATOID ARTHRITIS\*

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FIVE YEARS have elapsed since cortisone and ACTH were first shown to relieve dramatically the pain, stiffness and joint swelling in rheumatoid arthritis.<sup>1</sup> These hormones remain valuable symptomatic remedies in the treatment programme of today, but it has become abundantly clear that they do not alter the natural course of the disease and effect a cure.<sup>2</sup> It has taken a considerable length of time to reach this conclusion because the natural course of rheumatoid arthritis varies so much from patient to patient.<sup>3</sup> While no carefully controlled study has even yet been carried out, accumulated evidence indicates that the hormones act on tissues purely as anti-inflammatory agents, and do not correct the underlying and still unknown metabolic disorder which is the root of the trouble.<sup>4</sup> The failure of these hormones to cure has been disappointing, but their proper use as symptomatic agents is an integral part of the medical management of rheumatoid arthritis.

*Appraisal of the patient.*—Anyone who has had much to do with rheumatoid arthritis cannot but be impressed with the great variation in the natural course of the disease. Some patients suffer recurring joint pain and swelling over a period of many years, but never become very ill or develop significant joint damage; others become bedridden, anæmic, wasted and crippled in a short space of time. Approximately 50% of any large group of patients can be expected to have a complete remission of symptoms or a mild course featured by recurring pain and swelling in the joints. Unfortunately, despite the best of care the other 50% develop joint deformities, sometimes to a degree which confines them to bed or wheel chair (Table I). When a patient first presents with his disease a short period of hospital study has several uses. It allows more time to explore the various stresses and strains which have precipitated the disease and which should, if at all possible, be removed in order to bring about remission. It provides an opportunity to assess accurately the

course of the disease to date, the severity of the systemic reaction, the amount of joint damage, and thus the prognosis. While the patient is in hospital, his response to rest, drugs, and physiotherapy can be determined. He can be made to realize the limitations of medical care, and how he must alter his way of life should that be necessary. He should leave hospital with a much clearer conception of his problem than when he came in, and what to do about it.

### GOLD SALTS

Gold salts were first popularized as treatment for rheumatoid arthritis 25 years ago by Forestier. All would agree that administration of gold has not the dramatic effect of ACTH and cortisone or even the moderate value of salicylates in relieving pain and suffering. It has no anti-inflammatory tissue action. There is controversy, however, as to whether it alters the natural course of the disease and increases the likelihood of remission. It is unfortunate that despite the spate of publications on the use of gold in rheumatoid arthritis no carefully controlled study of a sufficiently large series of cases over a long enough period of time has yet been undertaken to prove this point. Experienced workers such as Bauer and Ragan have had poor results with gold. Table II presents some recent data of Ragan which indicate that gold has been of no value in his large series of cases. However, his data are not conclusive because the case material has been reviewed in retrospect, and those cases treated with gold may have differed in their clinical course from those which received no gold. It is clear, in any case, that if gold salts are to be used their limitation should be borne in mind. If a patient has received 50 mgm. of gold salt weekly, and has not been helped by the time one gram of the drug has been administered, there seems little point in continuing therapy. Toxic reactions will occur despite the best precautions, but can now be treated successfully with cortisone and BAL. Cortisone is used in relatively large doses, 300 to 500 mgm. daily, to subdue acute inflammatory tissue reactions when they develop, and BAL is given to interfere with the toxic action of gold still retained in the tissues.

### ACTH AND CORTISONE AND HYDROCORTISONE

One of the most important aspects of treatment is relief of pain and suffering. No drugs

\*Presented at the Postgraduate Refresher Course, Ottawa Civic Hospital, 1953.  
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TABLE I.

THE NATURAL COURSE OF RHEUMATOID ARTHRITIS					
MASSACHUSETTS GENERAL HOSPITAL SHORT AND BAUER'S SERIES <sup>5</sup> 250 CASES			PRESBYTERIAN HOSPITAL RAGAN'S SERIES <sup>6</sup> 374 CASES		
		Percentage			Percentage
Good end-result.....		53.2	Good end-result.....		48
In remission.....	15.2		In remission.....	26	
Moderately or slightly improved	38.0		Occasional joint pains.....	22	
Poor end-result.....		46.8	Poor end-result.....		52
Stationary.....	12.8		Flexion contractures and inactive.	13	
Worse.....	34.0		Flexion contractures and active...	29	
			Bed or wheel chair.....	10	

TABLE II.

374 CASES OF RHEUMATOID ARTHRITIS AFTER FIVE YEARS  
(FROM RAGAN<sup>6</sup>)

% of cases with	201 cases treated with gold	173 cases treated without gold
Complete remission.....	22	32
Occasional joint pain.....	21	22
Flexion contractures, inactive.	14	11
Flexion contractures, active...	35	22
Confined to bed or chair.....	8	13

can match the hormones in this respect. It is now recognized that ACTH and cortisone, when administered in relatively large doses as compared with their normal output in the body, exert an anti-inflammatory action on tissues in this and other collagen diseases so that the joint swelling subsides and generalized tissue pain and stiffness disappear. There are three preparations which can be used: ACTH, cortisone, and hydrocortisone, and all three are effective. ACTH has certain disadvantages which have interfered with its widespread use in rheumatoid arthritis. It is a biological extract and is still impure; there is, therefore, some variation in strength from dose to dose. It is more expensive and has to be injected. A possibility exists that, because it is an impure material, continued use may provoke antibodies which interfere with its action.

These objections to the use of ACTH have led to the adoption of cortisone as the drug of choice. When cortisone is given in a dose of 200 to 300 mgm. a day, the patient feels better within a matter of 12 to 24 hours, and his subjective feeling of improvement is quickly followed by reduction in joint swelling and pain. When clinical improvement is well under way the erythrocyte sedimentation rate begins to fall

and, if the dose of cortisone is large enough, it may return to normal. Fig. 1 illustrates a typical response. Doses of this order almost always provoke water and salt retention and in older persons may precipitate congestive heart failure. In a few weeks' time the facial tissues, particularly of women, fill out and may become hirsute. Latent peptic ulcers are apt to flare into activity and have actually perforated or bled. The osteoporosis which is a part of the disease is aggravated and fractures may occur. Inactive tuberculosis may stir into activity, and intercurrent infections may start up only to have their signs and symptoms masked by the cortisone. No matter how long the drug is administered, relapse seems to set in after it is discontinued. The sedimentation rate first begins to rise and this is followed by recurrence of pain, stiffness, and joint swelling. To make matters worse, the patient is very apt to become discouraged and depressed with the resurgence of symptoms, which adds further to the problems of management.

It is thus inadvisable to give patients such large doses of cortisone even for short periods of time. The aim should be to use the smallest daily dose needed to control symptoms. This usually amounts to 50 to 75 mgm. per day. Such a dose has no effect on the sedimentation rate. The vast majority of patients can take small doses of this order for many months without developing troublesome complications. A woman's features will probably become puffy, and a man may develop ulcer pain, but little else is likely to happen. Slight water retention may develop initially, requiring restriction of salt and the administration of ammonium chloride for a few days, but even if no treatment is given the disturbance of water balance usually adjusts itself in a short time and no further disturbance re-



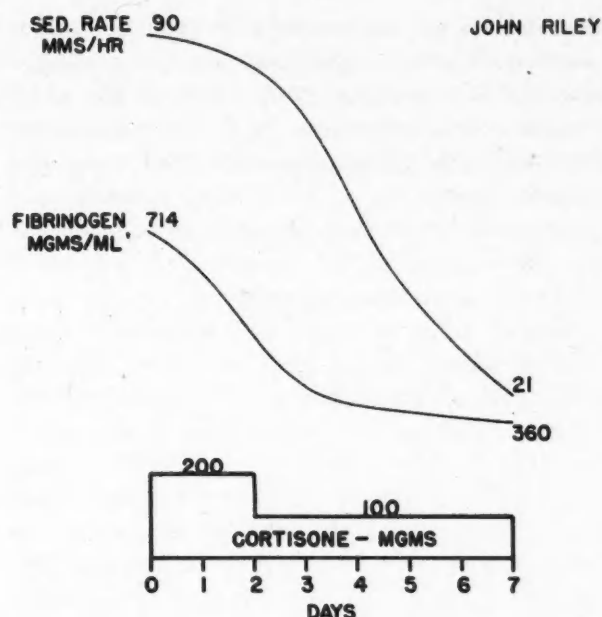


Fig. 1.—Cortisone effect on sedimentation rate and fibrinogen.

sults. In summary then, cortisone should be reserved for the patient who requires it for relief of pain in order to go about his daily work, or as a temporary measure when undergoing orthopaedic procedures, or when subjected to special stress. If the patient can be made comfortable without it, so much the better.

Hydrocortisone has effects which are identical with those of cortisone when it is given by mouth or by injection. There is some evidence that it is slightly more potent, milligram for milligram, but its greater expense more than offsets this advantage. Its chief use at the present time is restricted to intra-articular administration where its effects are superior to those of cortisone. Injection of 50-75 mgm. into a swollen, painful joint dramatically relieves the inflammation, and the beneficial effects may last many weeks. If at the same time local measures are instituted to rest the joint, the benefit may be permanent. However, unless such measures are adopted, recurrence of joint inflammation is to be expected. When given locally in this way hydrocortisone has little or no appreciable systemic effect and its use is therefore reserved for those patients whose disability is largely confined to one or two joints.

#### SALICYLIC ACID DERIVATIVES

Salicylic acid derivatives, like cortisone and ACTH, exert an anti-inflammatory tissue action

in collagen diseases, although to a much less marked degree. It is not possible to obtain the dramatic effects in rheumatoid arthritis that one can obtain in rheumatic fever, where it is common to see large doses of aspirin quickly relieve joint pain and swelling, reduce fever and lower the sedimentation rate. Even if doses of aspirin or sodium salicylate are pushed to toxic levels in patients with rheumatoid arthritis, there is no appreciable effect on the sedimentation rate. However, a daily ration of 40 to 50 grains of acetylsalicylic acid is of considerable value in relieving pain and stiffness and adding to the patient's comfort. It is rarely possible to increase the dose above this level because of the development of heartburn, epigastric pain, nausea or vomiting or of dizziness, tinnitus and deafness. A few patients cannot tolerate even small doses of aspirin, and one may have to resort to enteric coated preparations which, while they are less apt to cause indigestion, are less reliable in their therapeutic effects. There are a host of proprietary preparations available for use. Most of these are more expensive and less effective than acetylsalicylic acid. In practice one regulates the dose of acetylsalicylic acid to a tolerable level and then adds cortisone when necessary for those patients who require additional relief of pain.

#### SEDATIVES AND ANODYNES

It must be remembered that the amount of pain suffered by patients with rheumatoid arthritis cannot be quantitatively related to the acuteness of the inflammatory reaction going on in the tissues. Tense, anxious patients react abnormally to their pain, and may be disabled by pain which is out of all proportion to the severity of the disease. Such patients may find that small doses of sedatives are of more symptomatic value than any other drug which they are given. It is wise to take a firm attitude in the use of anodynes and to restrict their use to small doses of codeine. The new drug phenylbutazone seems to have no place in the treatment of rheumatoid arthritis other than as an anodyne, and the high incidence of toxic effects which it produces restricts its use in a chronic disease of this sort (Fig. 2). Phenylbutazone, like colchicine, has prompt effects in relieving acute gout, but unfortunately, again like colchicine, does not have the same effects in rheumatoid arthritis.

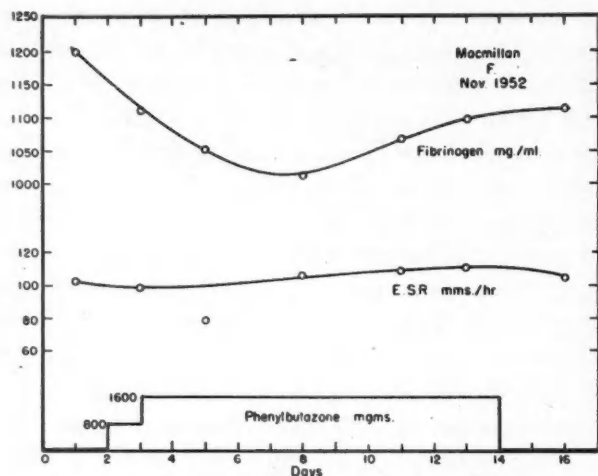


Fig. 2.—Phenylbutazone effect on E.S.R. and fibrinogen.

### REST

So far, emphasis in management has been pharmacological, but rest still remains the sheet anchor of treatment. Until more specific medicinal remedies are available, rest and relaxation are the agents most likely to hasten remission. Patients must be convinced of the necessity of an afternoon rest and about 10 hours in bed at night. Ease of mind is even more important than ease of body, and it may be necessary to enlist the aid of a psychiatrist to overcome anxiety and tension and of agencies to relieve social problems. Many patients feel that they must "keep going" in order to prevent their joints from becoming stiff. They do not realize that trauma increases joint inflammation and hastens destruction of cartilage. Thus it is essential for a housewife with swollen knuckles and wrists to give up scrubbing floors, wringing clothes and such like, and to allow herself only light duties which provoke no increase in joint pain or swelling. When knees, feet or ankles are affected there is no substitute for reduction in weight bearing. There is no reason why the patient cannot rest for part of the day in a chair, but the ideal position is the recumbent one, both supine and prone, on a firm mattress which makes it easier to roll over and which prevents hip sag.

### EXERCISE

Exercise is the most important aspect of physiotherapy. It is designed to preserve and restore muscle tone and power, and to prevent and correct joint deformities. In order to accomplish this, exercise must be active. The patient must do it himself and govern its intensity so

that it does not aggravate joint pain. If it does, exercise defeats its purpose. Muscle wasting is one of the important components of the rheumatoid state. Sometimes it is so marked that weakness rather than pain is the chief complaint. Muscles waste for at least three reasons: (1) because of the catabolic breakdown of protein in the active stage of the disease, (2) because of pain and (3) because of inactivity.

General tonic exercises help to counteract the wasting which results from inactivity, although it must be admitted that in some individuals the course of disease is so severe that no amount of tolerable exercise will prevent wasting. In addition to such a general exercise programme particular stress should be placed on specific exercises which prevent or arrest developing joint deformities such as hyperextension of the interphalangeal joints, flexion and adduction of the metacarpophalangeal joints, flexion of the wrists or knees, or pronation of the feet and ankles.

### SPLINTING

Sometimes, despite the best efforts of the patient, joints tend to assume a deformed position at rest. Then it is advisable to splint the joint. Splinting is also a useful technique for correcting deformities which have already developed. Undesirable wrist or knee flexion may be overcome in this fashion.

Intravenous Pentothal (thiopentone) may be used to produce the greatest possible relaxation and correction of deformity before the splint is applied. After a few weeks a new splint can be applied and gradually deformity is overcome. Such a technique is preferable to attempts at forceful manipulation which are only too likely to cause a good deal of after-pain without benefit. Splints should be fashioned, if possible, so that they can be removed daily for active and passive movement of the affected joint. This may overcome any tendency to ankylosis brought about by fixation of the joint. Splinting probably has, in fact, the opposite effect because of the rest and consequent reduction in inflammation which it provides. Ankylosis develops rapidly in some patients regardless of what is done and no amount of local care to the joint can prevent it.

### HEAT AND MASSAGE

The other physiotherapeutic tools which are of benefit are heat and massage. Local heat to joints, whether in the form of a heating pad, an



infrared lamp, or wax or whirlpool baths, is soothing and reduces inflammation. Heat should be applied for 20 to 30 minutes, two or three times daily. Whirlpool baths add to the heat the massage of the swirling, bubbling water. Manual massage is of greatest value in relieving aching and stiffness of soft tissues.

#### TREATMENT OF ANÆMIA

A variable amount of anæmia accompanies rheumatoid arthritis. Usually it is normocytic and normochromic and is not helped by any specific remedy. Correction of the anæmia requires correction of the activity of the rheumatoid state. Sometimes there is a hypochromic or microcytic quality which is helped by administration of iron, either orally or intravenously. Rarely an acute hæmolytic anæmia develops which may require urgent treatment with cortisone, transfusion and splenectomy. Transfusion may be useful in another instance: where the patient is weak, wasted and demoralized. It will correct the anæmia in such a patient, but in addition may increase vitality, may actually temporarily suppress disease activity, and in general tide the patient over a critical period.

#### DIET

Two other common extra-articular manifestations of rheumatoid arthritis are muscle wasting and osteoporosis. These, like anæmia, reflect the severity of the systemic disturbance and cannot be remedied by any specific measure. It is reasonable to prescribe a high protein, high caloric diet to replenish muscle protein. Testosterone has been used as a remedy for this purpose because of its anabolic effects, but these are slight and have proved disappointing in clinical practice, nor are they of any value in counteracting the rarefaction of bone.

#### CONCLUSION

It is all too apparent that limitations in medical treatment of rheumatoid arthritis are great, but if advances of the next five years are comparable to those of the past five, the outlook for more specific control of the disease is good.

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#### RÉSUMÉ

Depuis cinq ans, nous avons appris que l'ACTH et la cortisone n'agissent dans le rhumatisme articulaire aigu que comme palliatifs en supprimant la réaction inflammatoire sans affecter l'étiologie. La maladie se présente avec des variations considérables allant d'une attaque passagère ne laissant aucune trace jusqu'à l'incapacité totale résultant de l'anémie, la cachexie et l'immobilisation de plusieurs articulations. L'emploi des sels d'or est discutable, et il n'existe encore aucune série de cas où des conclusions basées sur des statistiques puissent nous guider dans l'évaluation de cette méthode de traitement. Trois hormones peuvent être utiles dans l'arthrite rhumatoïde, à savoir: l'ACTH, la cortisone et l'hydrocortisone. La seconde est la plus communément employée. La dose habituelle est de 50 à 75 mgm. par jour. La plupart des malades peuvent continuer le traitement pendant des mois avec un maximum de soulagement et un minimum d'effets fâcheux. L'hydrocortisone est surtout employée en injections intraarticulaires de 50 à 75 mgm. Ce mode d'administration ne donne qu'un effet localisé. La douleur et la raideur des articulations sont souvent améliorées par une dose quotidienne de 40 à 50 grains d'acide acétylsalicylique. La tension nerveuse peut souvent augmenter la douleur causée par l'inflammation des articulations. Si tel est le cas, l'emploi de sédatifs peut améliorer l'état du malade. La détente que procure le repos physique et mental demeure la condition primordiale de tout succès thérapeutique. Lorsque les progrès du malade lui permettent l'accomplissement de certains mouvements, ceux-ci doivent être dirigés dans le but de conserver, sinon améliorer, le tonus musculaire et empêcher les difformités articulaires. La physiothérapie à ce stage peut rendre de très grands services. Dans certains cas, les articulations restent rebelles et doivent être bandées en éclisses afin d'éviter l'aggravation de la difformité (celles-ci peuvent quelquefois être réduites sous anesthésie). L'application locale de chaleur aux articulations enflammées ainsi que l'usage judicieux de massage sont des adjuvants précieux au traitement. L'anémie normocytique et normochromique qui accompagne souvent la maladie peut tarder à répondre à la médication martiale; c'est pourquoi quelques transfusions peuvent s'avérer fort utiles au début. Un régime riche en protéines et en calories peut offrir une compensation à la dégénérescence musculaire et à l'ostéoporose qui résultent souvent de l'immobilisation prolongée.

M.R.D.

#### POISON CONTROL CENTRE IN U.S.A.

The hospital of Duke University, North Carolina, has announced the establishment of an emergency poison control centre to cope with the increase in accidental poisoning. Besides treating victims, the centre will serve as an information bureau. The public and doctors have been advised to telephone for advice on emergency treatment.

The centre reported that of 14,000 deaths each year among children between the ages of one and 14 years, almost 1,500 are caused by the accidental swallowing of poisons. A director of the centre stated that in twelve Southern states the death rate from arsenic and corrosives was six times higher than elsewhere in U.S.A., and that the rate from petroleum products was four times higher.—*The New York Times*, December 14, 1954.

## CARCINOMA OCCURRING ON THE BASIS OF PRE-EXISTING GASTRIC ULCER\*

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EARLY DIAGNOSIS is an important facet of the cancer problem. The question whether ulcers become cancerous, concerning which there is much difference of opinion, is an integral part of the problem. The profound degree of deviation of opinions on it, as well as the importance of the question, was adequately demonstrated at a panel discussion of this subject which took place in New York in January 1949.<sup>1</sup> While the divergence of the various opinions expressed reflected the relevant medical literature, the most striking fact was the apparent reluctance to commitment in favour of the positive point of view.

To the difficulty of establishing proof can be attributed the great discrepancy, as evidenced in the high incidence figures reported by MacCarty and his associates<sup>2 to 6</sup> on the one hand and, on the other, the opinion<sup>1, 7 to 12</sup> that this condition "... either never occurs, or does so extremely rarely." Or, as stated by Rienhoff and Baker,<sup>13</sup> an ulcer is either malignant from the beginning or else does not become malignant, although later in their text, rather inconsistently, they advocate gastrectomy "to avoid the occurrence of malignant change in a chronic ulcer."

Medical opinion is divided into three main trends on the question of gastric ulcer and its relation to gastric cancer, as well as on the therapeutic approach in the handling of this problem. A trend led by the Mayo Clinic group favours gastric resection if possible, or in the case of ulcers situated in the region of the cardia, excision of the ulcer and gastroenterostomy. This approach is based on the impossibility of absolute differentiation between benign and malignant gastric ulcer, coupled with the great frequency with which an apparently benign ulcer is ultimately found to be carcinomatous or an ulcerated carcinoma.

In a statistical study of 2,840 gastric resections at the Mayo Clinic from 1907 to 1938, the ulcer type of syndrome appeared as the first group of symptoms in 33% of the resectable cases of gastric carcinoma.<sup>14</sup> With a resection mortality of 3% to 5% in their hands, the Mayo group maintains this procedure to be the rational approach to the solution of the problem. During the same period 10,890 patients were diagnosed as having

malignant lesions of the stomach. Of these, 6,352 submitted to operation and the diagnosis was substantiated in 98%. In this group, 37% of the patients with resectable lesions and 25% with unresectable lesions gave histories which presented features usually associated with peptic ulcer. On the basis of this relationship between symptomatology and operative findings, gastrectomy was performed in 64% of patients in 1940.<sup>15</sup>

Edwards<sup>16</sup> considers it impossible to distinguish simple ulcer in the pyloric antrum from carcinoma, and therefore also favours gastric resection as the procedure of choice, without a preliminary trial of medical therapy.

Between 1940 and 1945, 464 patients with apparently benign gastric ulcer were treated medically at the Mayo Clinic. Adequate follow-up was possible in 414 of these. The results of conservative therapy were satisfactory in only 20.5%. Of the entire group 33.8% consented to operation. Cancer was present at the start or appeared late in 10.4% of the whole group. Nine of the patients not operated on died of cancer; 5% of the patients who were not submitted to operation and who were living five years later had cancer.<sup>17</sup> In discussing this paper editorially, Alvarez points out that when first seen perhaps 5% of ulcers that look benign are already cancerous, and as early as five years later another 5% have cancer of the stomach, and that the individual who appears to have a small benign gastric ulcer continues to face a risk 50 times greater than normal of acquiring cancer of the stomach in his later years.<sup>18</sup>

These, then, are the facts which motivate the stand of those who advocate surgical eradication of all ulcerating lesions of the stomach. At the other extreme is the group which believes that the incidence of malignant degeneration of gastric ulcer is extremely small, if it occurs at all, and is emphatic in its insistence that such rare occurrences do not justify gastric resection for peptic ulceration because of the fear that the lesion may become malignant. This point of view is not without justification even if judged solely on the basis of operative mortality; the low rate attained by the Mayo Clinic surgeons is not approached everywhere, and certainly not in the small centres.

This group contends that many of the reported occurrences of cancer on ulcer are erroneously diagnosed. These errors, they maintain, are inherent in the difficulty of establishing a diagnosis on the basis of the clinical history (an opinion held by all three groups); radiological criteria are not sufficiently accurate and, among other things, the size of the ulcer does not guarantee its malignancy or benignancy.<sup>1, 19</sup> It is conceded by many clinicians that, while MacCarty's observation may hold good in the larger sense, it is definitely not dependable as a diagnostic aid in any specific instance. Healing may occur in an ulcerated cancer as well as in a benign ulcer,<sup>9</sup> and lastly, even the histological interpretation of the resected specimen is often erroneous: the criteria presumed adequate for establishment of the diagnosis of cancer on ulcer can be mimicked by extensive peptic ulceration of a cancerous lesion.<sup>9</sup> Carcinoma *in situ* may be almost completely digested, leaving only a small area of the original lesion intact and presenting the picture of an apparent gastric ulcer with a small focus of carcinoma in its edge.<sup>20</sup> Histological evidence favouring malignancy may be produced by distorted calls at the edge of a benign ulcer which are drawn, through cicatrization of the lesion, toward the base of the ulcer.<sup>21</sup>

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The middle-of-the-road group, of which the Gastroenterology Department of the Lahey Clinic is a good example, follows well-defined general principles but individualizes the treatment in that the ultimate decision is based on the response to therapy of a specific patient. The contention of this group, as again expressed in a recent publication by Smith and Jordan,<sup>22</sup> is that while gastric ulcer carries a potential threat of malignancy, the danger is not so great as to warrant resection of all gastric ulcers. Lack of response to an energetically carried out medical regimen, continued for six to eight weeks, or recurrence of the lesion in an initially successfully treated case, carries the implication that the lesion may have malignant potentialities and should be treated accordingly.

In a study of 660 gastric ulcer cases the incidence of malignancy was 9.8%—59 cases. Of these, 44 were operated upon and proved histologically; 12 did not undergo operation because of refusal, old age or concomitant disease, but clinically these were malignant; two were treated as benign, but proved at postmortem (six and 23 years later) to be malignant. Of the cases diagnosed as benign and treated medically, 111 were followed up for five years or longer; of these, two developed carcinoma.

In a group of 20 patients who remained on medical treatment for two months to seven years, and were then operated upon and found to be malignant, the authors feel that in at least some cases the malignancy occurred only with a later recurrence. It is the belief of Shields Warren that with the healing and breaking-down process cell changes occur which may give rise to malignancy.

The authors make the point that of the 98 cases of gastric ulcer, unassociated with duodenal ulcer, and followed up for five years or longer, 40.8% had recurrences and 59.2% did not; that is, nearly 60% of this group certainly had no malignant changes in the original ulcer, and if they could be protected against recurrence, they would be safe from the danger of future malignancy.

Much the same attitude toward the problem is expressed by Gray and others,<sup>23, 24</sup> who stress that ulcerating lesions of the stomach must be considered as potentially malignant until proved otherwise; that even a malignant lesion may show a tendency to heal and therefore that nothing short of complete healing can be considered adequate; in the presence of complete healing as demonstrated by roentgenological and gastroscopic examinations, even in the absence of subjective symptoms, careful periodic re-evaluation of the patient's condition is essential. Barrett<sup>25</sup> suggests that, as a problem of cancer control, physicians might do well to be more alert than ever before. Basing his conclusions on the reports of Allen,<sup>26</sup> Judd and Priestley<sup>27</sup> and Kiernan and Larsen,<sup>28</sup> he states, "these should convince anyone that the risk of a mistake in diagnosis is a very great one." Also, "A fair yield of gastric cancer might be anticipated from a control programme designed to discover early cancer in patients with gastric ulcer; about one cancer in ten patients might be expected . . ." Stout,<sup>1</sup> in referring to a group of 26 cancer patients followed up for some time, stated that 17 had ulcer symptoms from two to 27 years preceding the development of malignancy: "I do not know whether in every one of these the ulcer was at the same site at which the cancer developed. I do know it was in a number of them. It is impossible for me to believe that a patient

can have gastric cancer for this long period. It must be something new developing at the site where there was a preceding or continuous ulcer."

What conclusions can one draw from a study of these three distinctly different clinical approaches? In the predominantly surgical approach, it is considered wiser to eradicate the disease surgically in all patients with gastric ulcer; not all patients, however, will submit to operation. The selection of cases for surgical intervention is not made by the physician only, but partly by the patient. The situation obviously cannot be considered as paralleling the circumstances in which a patient refuses surgical intervention when a clear-cut diagnosis indicates that this is imperative. Even though Waltman Walters states that "Partial gastrectomy was performed only when the nature of the lesion and the condition of the patient warranted this procedure," the relatively high proportion of patients presumed to have gastric ulcer and subjected to gastrectomy during the past few years, namely around 60%, exceeds by far the 10 to 20% accepted generally as the probable incidence of carcinoma, whether on the basis of a benign peptic ulcer or as a malignant ulcer from its inception.<sup>14, 15</sup>

The approach based on the view that cancer does not develop on the basis of a pre-existing peptic ulcer would be considerably strengthened by evidence of a more positive character, and will be considered later.

The middle-of-the-road course appears to be the most desirable from several points of view: (1) It takes cognizance of an approximately 1 in 10 risk to the gastric ulcer patient of developing superimposed carcinoma. (2) It does not, because of this expected incidence, attempt to subject all gastric ulcer patients to gastrectomy with the concomitant mortality rate of approximately 5% in the best hands and materially higher rates in those of the less capable. (3) It selects, on the basis of frequent observation and re-evaluation of each patient, potential candidates for malignant degeneration of the gastric lesion. (4) In the search for deciding factors in the therapeutic approach, it is on the lookout for better diagnostic differentiation, which leads to better results and to a better understanding of the problem. (5) It strives to reduce the risk for those believed to have cancer, by subjecting them to operation, and for those believed to have benign gastric ulcer, by advocating a medical regimen.

The diagnosis of cancer on ulcer is not readily made; it is based on a growing suspicion in the mind of the clinician, because of a concatenation of disturbing features, that all is not well with a particular gastric ulcer patient. Because of this suspicion the patient is observed more carefully and, on the basis of convincing clinical facts, gradually the suspicion is sufficiently substantiated to warrant surgical intervention. This moderate approach differs materially from the possibly justly criticized procedure of resecting all ulcer-bearing stomachs because of the potential danger of superimposed malignancy, on the one hand, and the opposed opinion that the lesion is or is not cancerous from the very inception of the disease, in proof of which are given the oft-cited observations on fairly large groups of gastric ulcer patients over a period of many years, without a single instance of malignant degeneration within the lesion.<sup>32</sup> It is legitimate to consider the latter as proof only of the infrequency of this occurrence, but not of its non-existence. If used as an argument against the occurrence of cancer on ulcer, it is just as illogical as would be the assumption that, because several careful observers had found no evidence of cancer of the stomach in mass surveys of as many as 500 individuals of the cancer age, cancer of the stomach does not occur.<sup>29</sup> When larger numbers are examined, as in the case of the 2,413 reported by St. John and his collaborators,<sup>30</sup> a truer picture of the facts is established, three such cases having been uncovered.

Is there anything tangible in the way of disturbing features referred to above, or in the physical and laboratory findings, which may direct the attention of the physician toward the possibility of the presence of a malignant lesion? How valid, finally, are these findings in the cold light of the histopathologist's critical examination? The literature contributes some answers to these questions. While there is no unanimity of opinion, certain facts do stand out, and these will be summarized briefly.

#### PHYSICAL FINDINGS

The physical findings contribute nothing to the early diagnosis of gastric carcinoma, whether as the only lesion or one superimposed upon a gastric ulcer.

#### LABORATORY FINDINGS

While achlorhydria is frequently present in the older age groups, Barrett<sup>25</sup> points out that the

incidence in normal subjects ranges between 20% and 25%; in gastric cancer the incidence is about 50%, and if hypochlorhydria is included it is in the vicinity of 65%. Barrett believes that this knowledge could be utilized in a cancer control programme. In this connection it is of interest that 59% of the Mayo Clinic series of about 11,000 cases of cancer of the stomach had no free HCl. Harnett<sup>31</sup> compares the findings by St. John<sup>30</sup> of two carcinomas and one lymphosarcoma in 2,413 apparently healthy persons over 50, an incidence of 0.124%, with the findings of State and his associates,<sup>32</sup> who subjected 1,253 patients over 50 to a histamine gastric analysis; there were 350 instances of achlorhydria and 20 of hypochlorhydria among these, and the incidence of carcinoma was a little under 1%. Barrett feels that since one person in four of cancer age has achlorhydria, and approximately two out of three gastric cancers are associated with achlorhydria, the distribution is disproportionate and some sort of "concentration factor" must be operating. He believes that a systematic follow-up of large groups over 50 years of age, with achlorhydria, should yield in time cases of gastric cancer in a ratio of about one cancer to 150 to 300 patients.

Comfort<sup>1</sup> stated that, in the group of patients in whom cancer is suspected, the odds in favour of cancer are infinitely greater when anacidity or hypoacidity is present than when hyperacidity is present. LaDue<sup>1</sup> found an incidence of anacidity of 23% in 75 normal individuals; 7.4% in 81 patients with benign gastric ulcer; and 51.1% in 135 patients with resectable cancer. A histamine test carried out on 493 gastric-cancer patients revealed the presence of achlorhydria in 63.7%.

Persistence of occult blood in the stool, especially when the patient is confined to bed, is highly suggestive of malignancy of the gastrointestinal tract.

#### X-RAY FINDINGS

It is generally recognized that the following, in order of frequency, are favourite sites for the occurrence of carcinoma of the stomach: the prepyloric region; the lesser curvature in the vicinity of the cardia; the posterior wall; the greater curvature and, less frequently, the lesser curvature.<sup>35</sup> MacCarty's differentiation between benign and malignant ulcer, on the basis of size of the ulcer, has undergone considerable mod-



ification with the passage of time.<sup>34 to 37</sup> Kirklin and Weber<sup>38</sup> laid down criteria which may be helpful in some cases. In benign ulcer the radiographic image of the crater is dense; in malignant ulcer it is often faintly visualized; the benign ulcer crater is semicircular, with a round margin; in malignant ulcer the margin and the profile are irregular; the rugae in benign ulcer are accentuated and converging; in malignant ulcer the rugae in the immediate vicinity are obliterated. In benign ulcer, spasm is present; in malignant ulcer there is little if any spasm, and peristalsis is sluggish. The area of the benign ulcer is tender; that of the malignant ulcer is rarely so. The ulcerated carcinoma is likely to reveal a diagnostically helpful characteristic; it is in a sense a double lesion, the carcinoma revealing itself as a filling defect, or a subtraction from the normal contour; the ulcer is seen as a protrusion from the filling defect. Rivers and Dry<sup>39</sup> discuss some of the differential difficulties in x-ray diagnosis. Konjetzny<sup>40</sup> collected 225 studies dealing with the question of cancer developing on the basis of gastric ulcer. The incidence of this complication as reported by the authors concerned varied from 0 to 100%, but the majority favoured a figure in the vicinity of 5%. He believed this great divergence to depend on the criteria employed and the difficulty of establishing entirely satisfactory criteria. Gutman<sup>41</sup> contrasts the tendency of the ulcer niche to heal and to recur with that of the cancerous niche to persist and to grow. That this is not an absolute distinction has been convincingly demonstrated by Palmer<sup>42</sup> in the evidence of healing in cancerous ulceration. However, just as benign ulcer recurs or can recur, so does the carcinomatous ulcer, but here the parallelism ends: the latter inevitably kills if not eliminated in time.

#### GASTROSCOPY

Schindler has long maintained that gastroscopy is the most accurate method of differentiating benign from malignant ulcer, and, on the basis of his gastroscopic observations, stated that cancer hardly ever develops within a benign ulcer. That Schindler has recently changed his opinion would appear to be indicated by a recent contribution.<sup>43</sup> He states that an adequate follow-up of 273 gastric ulcer cases revealed a 7.3% error in diagnosis and adds: "None of the usual gastroscopic signs for differential diagnosis of benign and malignant ulcer seem to be entirely fool-

proof. Therefore, the clinician can accept the gastroscopic impressions only as suggestions which he has to correlate with other clinical facts." With this decidedly altered point of view one can hardly find fault. Decker<sup>44</sup> states that gastroscopy without biopsy does not permit an early diagnosis, and that even biopsy is often misleading. Benedict<sup>45</sup> expressed a similar opinion in stating that a negative biopsy from the edge of a gastric ulcer does not assure its benignity since the opposite edge may be malignant.

#### GASTRIC CYTOLOGY

Cytological study of the gastric contents by means of various modifications of the Papanicolaou method is a promising approach. The present experiments with various types of abrasive balloons appear to be a considerable advance over earlier methods. How effective this procedure will ultimately turn out to be, only increasing experience can show. Certain it is that all currently available methods, including radiography and gastroscopy, are inadequate in a certain percentage of cases and that other methods of diagnostic approach are essential.

Other, newer diagnostic methods now in the process of being tested have not so far contributed sufficiently promising results to warrant consideration at this time.

When finally the clinician calls upon the surgeon, and the resected specimen reaches the pathologist, he may still be faced with an equivocal answer. The complexity of the problem is so great that even the pathologists have not been able to agree on a number of important points. Stout<sup>1</sup> recognizes two varieties of ulcerating cancer: the ulceration of a fungating or projecting cancer, which practically never penetrates through the true muscle coat, and the penetrating cancer, either completely surrounded by a deep area of peptic ulceration or present at one side of the margin of a deep peptic ulcer. He also states that recurrent peptic ulcer creates favourable conditions for the development of cancer grafted upon or just opposed to a peptic ulcer. On the same occasion Comfort stated, "I do not know how often cancer develops on a benign ulcer, but in a small percentage of cases it certainly develops in a stomach that has been the seat of a previous ulcerative disease."

Boyd<sup>46</sup> believes that chronic gastric ulcer may become carcinomatous, just as an ulcer in any part



of the body may undergo malignant changes, and lists the following points as indicating such alteration: the edge is carcinomatous, but not the base, for the latter is densely fibrosed and resists invasion by cancer cells. Marked endarteritis is present. Complete destruction of the muscular coat and its replacement by fibrous tissue as well as fusion of the muscularis mucosae and muscular coat at the margin of the ulcer, due to healing, is present. Henke-Lubarsch stresses the importance of limitation of the carcinoma to one part of the ulcer edge; the base is free from cancer; the muscular layer is interrupted at the edge of the ulcer and the free edge has a tendency to be directed toward the surface.<sup>47</sup> Majno<sup>48</sup> distinguishes, in the anatomical criteria, between certitude and probability. As indication of certitude he accepts the presence of a large chronic ulcer at the edge of which is found a small carcinoma; probability can be admitted if the carcinoma has extended to the entire border or even to the base of the ulcer, but the base of the ulcerated carcinoma must still permit the recognition of the stratification of the different layers, dissociated and infiltrated, but not completely destroyed by the neoplasm. In carcinoma on ulcer the stroma is constituted, as in simple ulcer, of a fibrous matrix replacing all the layers in that area. Neuromas and arteritis obliterans in the base of a neoplastic ulceration are additional criteria of probability. The incidence of cancer on ulcer is given by most pathologists as in the vicinity of 5%—Ewing, Krasner, Boyd, Majno and others.

In 1940 Mallory<sup>20</sup> brought up the question of the relation of carcinoma *in situ* to the problem of cancer on ulcer. He stated that the basis of the structure on which is built the belief that carcinoma can develop in the edge of a peptic ulcer is unsound, since it is possible for cancer *in situ* to undergo almost complete digestion, leaving only a small intact area at the edge of the ulcer, presenting the apparent picture of a small, early malignant lesion at the edge of a chronic ulcer. The basis for this concept could have originated in Konjetzny's description of a carcinoma *in situ* plaque elevated by a submucosal abscess.<sup>40</sup> It is quite apparent from the illustration in his book that should peptic ulceration of this raised plaque occur, the base of the resulting ulcer could be quite free from neoplastic tissue. If, under such circumstances, the ulcer becomes chronic, it can present the picture of cancer on ulcer with a ring

of carcinoma surrounding the ulcer or, if the digestion is more complete, limited to a section only of the border.

Majno<sup>48</sup> finds important objections to this concept, if it is to be used as an argument against the existence of carcinoma on ulcer. Carcinoma *in situ* is rare, only "several tens" of cases having been cited in the literature. This hypothesis cannot, he states, be invoked to explain the picture of a very old and large chronic ulcer whose edge is the seat of a very small carcinomatous focus. Majno reaffirms his opinion that the development of cancer on the basis of a gastric ulcer cannot be denied and estimates that it occurs in 5% of extirpated ulcers.

Relatively few instances of carcinoma *in situ* have been reported and these mainly deal with the condition as it occurs in tissues accessible to inspection. There have not been many opportunities to observe the analogous condition in the stomach, as has been done by Konjetzny, and while the possibility exists, one must assume that the probable frequency does not exceed that in tissues available for visual inspection.

The final answer must be left to time and much careful observation. If either one or both of the concepts of cancer on ulcer and carcinoma *in situ*, as they affect the stomach, are found to be wrong, this will not have been a deterrent in the battle for early diagnosis of carcinoma of the stomach, since both accept the concept that what looks like an ulcer may in reality be a carcinoma.

#### CASE 1

S. M., male, age 41. The patient was first seen in January 1939 and had been well until six months before this date. During this period he had been troubled with pain in the epigastrium and vomiting, both occurring two hours after meals and at times during the night. The vomitus was very sour; it never contained frank blood or brown material. There was a loss of 15 lb. since the onset of the illness.

Apart from gonorrhoea, contracted 20 years previously, he had not had any serious illnesses. He smoked 20 cigarettes daily and drank moderately. The family history was good.

He showed definite evidence of loss of weight. The teeth were very poor and pronounced oral sepsis was present. There was tenderness in the epigastrium. Gastric analysis showed the highest free HCl and a total acid value of 53 at the 30-min. examination; the colour was normal and only small traces of blood were present. On several examinations, the stool varied from negative to one plus for occult blood. X-ray examination revealed the presence of a prepyloric irregularity, localized to the lesser curvature; the cap was irritable without any evidence of organic lesion. On an ulcer regimen, a modified Sippy diet and ten days of bed rest he improved materially, and a month after the onset of treatment he was asymptomatic and had gained 8.5 lb. On x-ray examination the prepyloric irregularity was less pronounced. Within another month he had gained an additional 8 lb., felt well and had an excellent appetite. Four months later

he returned with a loss of 15 lb. and persistent night pain. He attributed the loss of weight to the extraction of all his teeth. Because of this he did not feel that additional investigation was in order and promised to return later if there was no improvement. He did not return until seven months later with a further loss of weight, postprandial pain, vomiting and evidence of gastric retention revealed in a pronounced succussion splash elicited well below the umbilicus. The x-ray findings were interpreted as pointing either to a healed prepyloric ulcer, leading to cicatricial obstruction or to a prepyloric neoplasm on the basis of a previous peptic ulcer. There was a 20% gastric retention at 24 hr.

He was admitted to the Jewish General Hospital on June 12, 1940. There was evidence of marked loss of weight. The heart and lungs were normal. The abdomen was scaphoid, the liver edge palpable. Urine negative. The blood picture was essentially normal. Ewald test meal: free acidity ranged between 20 and 40; there were traces of occult blood in all specimens.

Gastro-intestinal series done on June 15 revealed hypersecretion, and persistent slight irregularity of the pyloric end of the stomach, just proximal to the pylorus. The duodenum was large without evidence of disease. There was no 24 hr. retention on this occasion. The radiologist expressed the desire to reexamine the patient and then thought that the irregularity appeared more extensive than believed at the first examination. The findings now strongly suggested to him the presence of an infiltrating lesion involving the distal half of the stomach. The writer's note at this time reads in part "... fluoroscopy strongly indicative of pyloric infiltration. The pyloric canal is constantly filled with barium, which is easily expressed from the stomach ... the picture is strongly suggestive of early malignancy."

Subtotal gastrectomy was carried out on June 20. An ulcer about  $\frac{3}{4}$  inch in diameter was present on the lesser curvature near the pylorus. In the opinion of the surgeon and the pathologist the lesion was benign, but the pathologist, Dr. Morris Simon, kindly consented to have several blocks cut and sectioned. Sections from the first block failed to show any evidence of malignancy and, had not several blocks been cut, the diagnosis would have been benign prepyloric ulcer.

Pathologist's report: All sections include a portion of the ulcer base which consists of granulation tissue and extends as deeply as the muscularis. In the base of the ulcer there is a diffuse infiltration of lymphocytes and polymorphonuclear leukocytes into the muscularis. At the edge of the ulcer in all sections the mucous membrane is somewhat irregular and simplified, and in the submucosa hyperchromatic groups of epithelial cells with irregularly sized and enlarged nuclei are encountered. For the most part, these atypical cells lie in the submucosa and slightly beyond it. Here the epithelial cells form poorly defined acini and the cells are hyperchromatic. Study of the sections shows that the ulcer lies on the gastric side of the pyloric sphincter.

Diagnosis: Poorly differentiated adenocarcinoma in peptic ulcer at the pyloric end of the stomach.

This patient has been seen at least once a year postoperatively and has had G.I. series on several occasions. In the period of almost 14 years since the gastrectomy, he has not shown any evidence of recurrence and has remained well.

#### CASE 2

Male, 56 years. The patient was first seen in the outpatient department in June 1937. The main complaint was epigastric fullness and pain three to four hours p.c. and occasionally at 3 to 4 a.m., relieved by bicarbonate of soda and present over a two-year period.

The weight was 172 lb.; B.P. 170/110; heart slightly enlarged. The urine was normal, the stool mildly positive

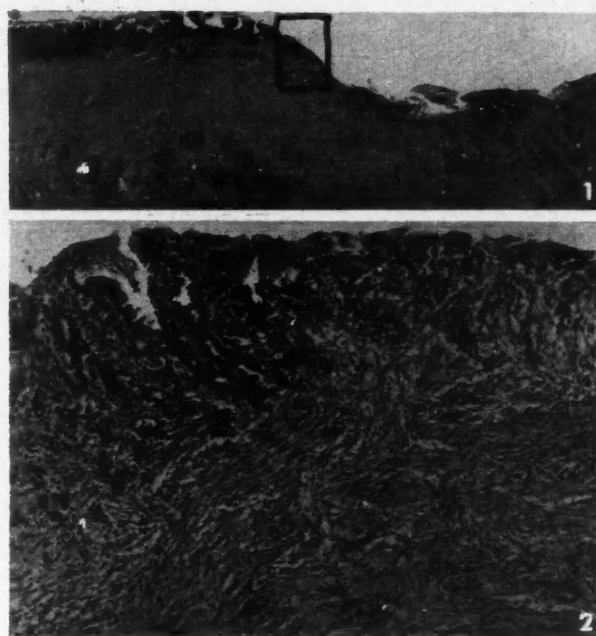


Fig. 1.—Section through ulcer. Magnification 6 times.

Fig. 2. (Case 1).—S.M. Magnification 100 times.

for occult blood. The gastric analysis (without histamine) showed no free HCl; the highest total acidity was 90, at 30 min. Repeated radiographic examinations failed to reveal any evidence of organic lesion; there was, however, at times a narrow constriction in the pyloric antrum "suggesting an hour-glass constriction, possibly at the site of an ulcer which is not visualized." The outpatient treatment was that for gastric ulcer, but the patient failed to improve consistently. Frequent examination did not reveal anything more than coarse gastric rugae and the occasional presence of a narrow antral constriction. In July 1939 the hour-glass constriction became more persistent; there was a slow loss of weight which reached 13 lb. by November. In view of the long, ineffective trial with various forms of therapy, the presence of achlorhydria, the patient's age, and the recent loss of weight, it was felt that the probability of gastric malignancy was high, in spite of the inconclusive x-ray findings and the absence of anaemia. Gastrectomy was recommended.

Reinvestigation in the ward resulted in the following relevant findings. Apart from moderate midepigastria tenderness the examination of the abdomen was negative. The red cell count was over 5 million; Hb value 100%. The stool had a four plus reaction for occult blood.

Subtotal gastrectomy was performed on December 13. A large, indurated ulcer was found near the cardiac end of the stomach close to the lesser curvature. The neighbouring glands were large but soft.

The pathologist's report stated in part: "The base of the ulcer shows granulation tissue with varying numbers of polymorphous leukocytes and the inflammatory process extends through the entire thickness of the remaining muscularis and consists predominantly of lymphocytes, round cells and rare polymorphonuclear leukocytes. Blood vessels are thickened and one section includes a fairly large vessel which has been eroded. This vessel opens to the surface and is filled with an organizing thrombus in which newly formed blood vessels and fibroblasts are seen."

"In two of the sections through the base of the ulcer, nests of epithelial cells are encountered which form poorly defined acini. The cells of these acini are hyperchromatic and irregular nuclear figures are seen. The cells penetrate rather deeply into the muscularis, and the basement membranes of the acini are poorly defined. This change represents early carcinoma with invasion of the muscularis in the base of the ulcer."



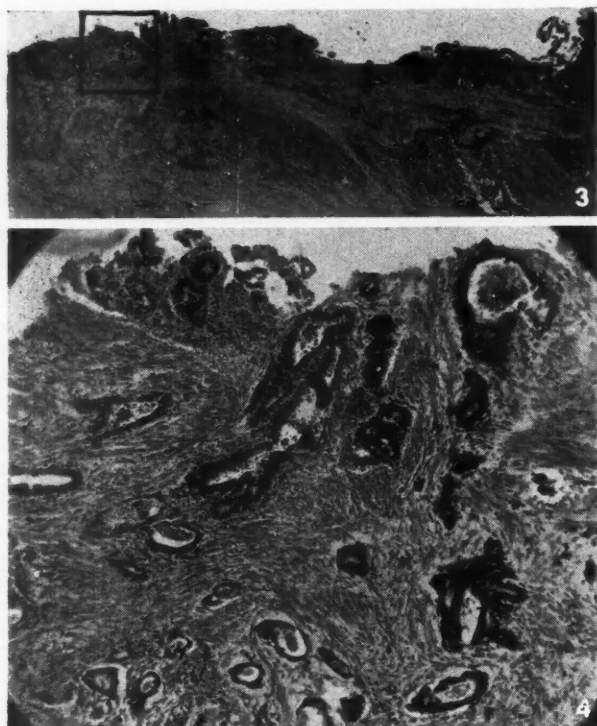


Fig. 3. (Case 2).—H.L. Section through ulcer. Magnification 5 times. Fig. 4. (Case 2).—H.L. Magnification 100 times.

The pathologist, Dr. Simon, made the following comment: "The gastric ulcer in this case is thought to be of considerable duration. The changes indicated as early carcinoma probably represent a malignant change superimposed upon a chronic gastric ulcer. Because these changes are minimal, and early, and since penetration is not extensive and because no evidence of metastatic tumor is seen in the adjacent lymph nodes, it is believed that the prognosis in this case should be good."

The postoperative history offers some very interesting features. About two months after the gastrectomy the patient began to complain of regurgitation and heartburn. The appetite continued to be good and the general condition was excellent. About a month later he developed slight postprandial nausea. The above symptoms continued intermittently, but by April 1941 the only complaint was of occasional regurgitation two hours after meals. His weight was constant at about 160 lb. The physical examination was essentially negative. G.I. series at this time indicated the presence of an infiltrating lesion of the lesser curvature extending to the cardia. The red cell count was 5,000,000; Hb 90%; sedimentation rate elevated. The patient refused readmission and gastroscopy. A year later the symptoms were much the same and the weight was 162½ lb. He continued without significant discomfort, loss of weight or anaemia, until the end of 1944, when anorexia and loss of weight became manifest; the main complaint was dysphagia. At the end of 1945 his weight was down to 138 lb.; there was no significant anaemia. By February 1946 dysphagia became pronounced and from this time on the disease progressed slowly until he finally died on May 18, 1948, eight and a half years after the gastrectomy—13 years having elapsed from the onset of the first symptom to the end.

This case presents several interesting features. Two years elapsed between the onset of symptoms early in 1935 and the diagnosis of gastric ulcer. Two additional years passed before a

diagnosis of probable malignancy on the basis of a gastric ulcer was made. The pathological specimen and the histological findings prompted the pathologist to express the opinion that the ulcer was of considerable duration and that the early carcinoma present was so minimal in extent that an optimistic prognosis was justified. From one point of view this may be said to have been justified since the patient lived for eight and a half years after the resection. This rather long postoperative survival period, associated with the histological evidence of non-penetration, and with the apparent recent onset of the malignant disease, suggests strongly the possibility that the patient ultimately died of a second primary. Proof of this is not possible, since autopsy permission was not obtained. Whether death was due to a second primary, or to an extension of the original lesion, convincing evidence, both clinical and histological, is in favour of a long-standing peptic ulcer; the presence of an early carcinomatous focus within it (the correctness of this belief tends to be borne out by the long survival period) constitutes, in the author's opinion, strong evidence in support of this being an instance of cancer occurring on the basis of a gastric ulcer.

#### DISCUSSION

After an extensive review of the pertinent literature, Barrett<sup>25</sup> comments as follows: "Achlorhydria occurs in the presence of gastric ulcer. Some gastric cancer patients with free acid have ulcer symptoms and some do not. To make matters worse, some gastric cancer patients with achlorhydria have ulcer symptoms. So it becomes apparent that there is so much overlapping between the various groups that clear-cut diagnosis of a given case may not always be possible. Even the surgeon who sees and feels the lesion at operation is also sometimes wrong in the diagnosis. . . . it appears that at present only a microscopic diagnosis is certain in all cases. No suggestion has been found in the literature as to how error in diagnosis may be avoided in the group of cancers that appear to be ulcers and may even show signs of healing under ulcer management."

The many difficulties enumerated by the opponents of the cancer-on-ulcer concept constitute diagnostic stumbling blocks, and could be responsible for some or even many errors in diagnosis, but, in the final analysis, a convincing histological



picture, fulfilling adequately all pathological criteria, where even carcinoma *in situ* can be eliminated by the evidence of long-standing inflammatory reaction in the base of the ulcer, should be adequate to establish the diagnosis. It is believed by some clinicians that when such a diagnosis is correctly established it is as a result of a fortunate accident and not of proper clinical reasoning.<sup>49</sup> It is in the interest of good medicine to find such cases, if they exist, by clinical methods rather than by fortunate accident, if this is possible.

It may be stated that in this controversy the position of the opponents of the idea of malignant degeneration of gastric ulcer is considerably weakened by an attitude of negativism. Adoption of the slogan, "Cancers may ulcerate but ulcers do not cancerate," may conceivably be instrumental in overlooking the occasional early malignant focus, through a still operable stage to a full-blown, invading and overwhelming malignant lesion that is beyond anything but palliative surgical procedure at best. The rather facile slogan regarding the non-"canceration" development of peptic ulcer logically brings up the question, "What proof is there of this contention?" There is nothing in the literature to suggest that it is based on accurate, recorded observation. It would appear that the strongest defence that has been made of this position is that its supporters have never seen an instance of this kind. This contention does not constitute proof, since it is the progeny of a preconceived belief, which precludes reorientation on the basis of timely laparotomies in appropriate cases. The contention that an experienced gastroscopist could, on the basis of repeated gastroscopic observations of a given gastric lesion, state with almost infallible certainty whether it is benign or malignant, and which led Schindler<sup>11</sup> to state that the development of cancer on ulcer never or hardly ever occurs, has lost some of its strength by virtue of his recent modification of his earlier point of view.<sup>43</sup>

One is prepared to grant the relative infrequency of occurrence and the possibility of cancer occasionally developing in the stomach in close proximity to a gastric ulcer, later to be engrafted upon it by extension. Granting these, and many other facts as well, one cannot accept this as evidence that the benignity of a gastric ulcer in some way protects it against malignancy except through extension from an adjacent lesion.

Is it not at least as close to probability that if biological conditions are suitable for development of cancer within an organ, an area of breaking-down and repair, such as exists in ulcer, constitutes suitable soil?

Even a cursory analysis of the situation regarding the differential diagnosis of gastric ulcer and gastric cancer must lead to the inevitable conclusion that there is a great deal of confusion, many diametrically opposed views, as well as a great deal of reluctance to see the other point of view. The additional problem of cancer-on-ulcer complicates the situation still further.

There is no single method which is even approximately reliable and dependable; neither is there in any sense anything like mathematical precision achieved in the employment of any of the available diagnostic methods. Faced with the problem in specific instances, one has the choice of accepting the rather drastic measure of submitting all cases of gastric ulcer to gastrectomy, or of adopting the principle that the problem presented by each patient must be solved on the basis of careful study and individual observation. Granted that some degree of error is unavoidable, it is also believed that the practice of excising all ulcerated stomachs carries risks, such as those accruing from the operative mortality rate even in good hands and from the fact that selection of cases for operation is in a large measure a matter of chance, since it is largely dependent upon the patient's willingness to submit to operation on the basis of a statistical possibility rather than specific facts as they apply to himself. Added to this exists the unpleasant possibility of the occurrence of troublesome post-operative symptoms which can be difficult to control. It is neither reasonable to subject every gastric ulcer patient to gastrectomy for fear the lesion may be or may become cancerous, nor to assume that ulcers do not become cancerous and that therefore they do not require surgical treatment other than for complications unrelated to cancer-on-ulcer. To maintain that once an ulcer always an ulcer would be a very useful method of approach, provided one could be absolutely certain that carcinomatous degeneration of the gastric ulcer never occurs. There is nothing to suggest that the presence of a peptic ulcer protects the damaged tissue against cancer; on the contrary, if there is any truth in the belief that areas which are the seat of chronic irritation are more susceptible to carcinoma, the

gastric ulcer area should certainly not be less susceptible.

There appears to be no royal road to accuracy in differentiating between benign and malignant gastric ulcer. The road is beset with pleasantly baited traps as well as steep, difficult pathways. For the present at least, the safest approach appears to lie along the steep pathways, utilizing statistics for what they are worth, medical slogans as picturesque clichés, and clinical sweat and toil, the only practical tools which take into consideration the individual in question.

"It is not easy," says Wangenstein,<sup>50</sup> "to choose the hard way—but today early diagnosis and surgery offer the only hope to most cancer sufferers. . . . The strongest carcinogenic agents we have to overcome are inertia and neglect. . . ."

#### SUMMARY

Some of the important literature dealing with the question of cancer on ulcer is reviewed and discussed.

An attempt is made to analyze the basic facts underlying the viewpoints of the three main approaches to the problem under consideration, and to evaluate the ultimate good of each specific approach.

The diagnostic difficulties encountered in specific instances are discussed, and the point is made that there are subtle, not always clearly defined, indications in the laboratory, x-ray and gastroscopic findings which, when carefully considered in the light of the associated symptomatology, not as it exists at a given moment, but as a moving, living expression of a disease that is not static, can give valuable leads.

Two instances of this type are described. The first presented symptoms and evidence of prepyloric ulcer; the course of the disease led to a change in the diagnosis from prepyloric ulcer to cancer developing on the basis of an old gastric ulcer. The gross appearance was such that both surgeon and pathologist believed the lesion to be a benign prepyloric ulcer. The histological picture supported the diagnosis of cancer on ulcer. The patient is still alive and well 14 years after resection. The second was subjected to gastrectomy on the basis of a four-year-old history of gastric ulcer which demonstrated unusual characteristics. Four years after the initial onset of symptoms the pathologist found, the malignant changes in the resected specimen to

be minimal and expressed the opinion that the prognosis should be good. The patient lived eight and a half years after resection, having lived 13 years from the time of onset of symptoms, and died from what is strongly suspected to have been a second primary lesion located in the gastro-oesophageal area.

The author wishes to express his thanks to Dr. L. Spector for his assistance in organizing the two case reports for publication.

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## Case Reports

### DIABETES MELLITUS— AN EXCEPTIONAL CASE

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*[This case report is simple enough, but it is an example of the experience we would like to have reported by older practitioners.—EDITOR.]*

ON JANUARY 4, 1932, Mr. D.H., aged 56, appeared at my office in Saint John, coming from the countryside about 50 miles away where I had practised some years previously. He is a good country type—millwright, lumberman, small farmer—versatile in his abilities and self-dependent in his judgments, as this case report attempts to show. His need was attention to a gangrenous great toe, and he was admitted to the Saint John Infirmary, now St. Joseph's Hospital. His case report, kindly disinterred by a Sister there, gives the following information.

Tenderness in all parts of feet since 1920, maximum in great toe joints. Until 1926 tenderness was felt only in winter, since then all the year round. Three years ago he had gangrene in the little toes of both feet; urine was not examined nor was any special diet prescribed, but the fifth toe of each foot was amputated by his doctor, a practitioner of homœopathy. He had thirst for five years, and polyuria for over five years. He had been losing strength for ten years, and losing weight since 1916; he then weighed 200 lb., now about 140 lb. He had had a dry tongue for at least five years. For the past three years he had had burning sensations in the legs and to some extent in the arms, with occasional momentary sharp pains in the right calf for two years.

**Physical findings.**—He was thin, and of a ruddy colour. P. 96. B.P. 192/90. Eyes: pupils normal, eyeball tension normal, eye movements normal. Skin normal, dry; no cyanosis. Tongue moist, red, not rough. Throat reddened. Radial arterial walls extremely hard, so rigid that the radial pulse was almost imperceptible. Pedal pulses all quite fair, even on the gangrenous foot, and popliteal pulses easily palpable. Liver edge palpable, slightly tender. Remainder of abdomen normal. Tendon reflexes all very feeble

in legs, normal in arms. Babinski normal. Abdominal reflexes present. Fundi—no retinitis.

The fifth toes of both feet were missing, and the whole of the right great toe was black and shrunk, with slight moistness at line of demarcation at base. Some redness and œdema of dorsum of left foot. The urine contained sugar, and the fasting blood sugar level was 220 mgm. %.

**Diagnosis.**—Diabetes mellitus; gangrene of right great toe.

**Radiographic examination of both wrists.**—There was marked calcification of the arteries. (The radiograms have disappeared, but I remember that there was a complete delineation, through calcification, of radial and ulnar arteries, palmar arches, and all digital branches.)

**Progress.**—Diabetes was simply controlled; by January 30, when the patient was discharged from hospital, he was on a diet of 65 g. protein, 100 g. carbohydrate and 150 g. fat with an insulin routine of 10-0-10 units; his urine was free from sugar and his fasting blood sugar was 120 mgm. %. Before discharge he was given instructions in diet, urinalysis, and routine of insulin self-administration. The gangrenous toe was treated with alcohol cleansings and powder dressings, and it remained dry. Buerger's exercises were carried out from the fifth day on. I find no record of reasons considered for not doing amputation, and they are not remembered.

My next acquaintance with Mr. H. was 22 years later, in October-November 1953; in the latter month he had his 78th birthday. I found him at his home, doing the morning house-chores, bright and well endowed with pawky wit. He gave me the interim history of his disability. On returning home from hospital in 1932 he decided to care for the ailing foot himself. The gangrenous right great toe remained dry and withered; he awaited its separation but after some weeks got impatient and returned to work, wearing a loose moccasin. Then he began to assist nature by gently "wiggling" the toe. The toe gradually "loosened," the proximal phalangeal bone "snapped" and separation was complete except for "a tough cord underneath." This he snipped ("it was tough") with the household scissors, but had to repeat the operation "because the end kept pushing out." After this, healing was soon completed, but the whole process had taken "quite a few months."

He was rather indefinite about his dietary programme, but has maintained insulin therapy faithfully, at 20 units twice daily, throughout the years, without sterilizing syringe or needles. Injections used to hurt, but of late years have not, and he has never had swollen or shrunken areas at the sites of injection. It has been hard to keep his feet warm "since he began insulin," and for some years there has been throbbing pain in them at night, but sleep has been undisturbed.

He could walk anywhere except through straw or soft snow, in which the remaining three toes of the left foot would give way dorsally and slow him down. He did general work until he was 72 years of age, eased up then, and since he reached 76 "has done nothing" but has kept active about the home. Occasionally he had "insulin reactions" — weakness and sweating — but always carried candy in his pocket and had no difficulty in correcting such situations.

There has never been a threat of further gangrene. Now, at the age of 78, he could pass for 68 years, mentally and physically. There is no prospect of profound investigation at this date, but to superficial observation his condition is good, peripheral arteriosclerosis being the most conspicuous degeneration. The radial arteries feel as "pipe-stem" as they did 22 years ago, and pulsation can be felt faintly only in the left one, at a regular rate of 80. Pedal pulses are imperceptible.

The skin of both legs shows moderate atrophic change but there is no oedema; the feet are well nourished, a little dusky in colour, and somewhat indurated, as are the remaining toes. Colour changes from elevation to depression are within normal limits. The left great toe is shortened and ankylosed at the interphalangeal joint, and all toe nails are mildly dystrophic. The scars of the three amputated toes are equally soft and free from tenderness.

#### SUMMARY

A case of diabetes mellitus with amputation of three toes at age 53 to 56 years. Self-treatment thereafter on an individualistic basis; no apparent detriment to normal living over subsequent years to the present age of 78.

Lancaster Hospital.

## ACTH AND CORTISONE IN TRICHINOSIS\*

### REPORT OF THREE CASES

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IN THE FOLLOWING PAPER I shall describe three cases of trichinosis which were treated with ACTH and cortisone. The literature was reviewed and it was found that five papers had been published on the subject.<sup>1 to 5</sup> The clinical results from the use of the hormones seemed to warrant further study of the subject.

#### CASE 1

A 35-year-old male foundry worker was brought to St. Joseph Mercy Hospital on March 24, 1953. He had become ill on March 1, 1953, with diarrhoea, chills and fever. He was having 15 to 20 bowel movements a day. The stools contained no blood or mucus and there was no melæna. The fever continued and one week previous to admission the chills became more frequent and disturbing. He had some vomiting early in the course of the illness. On March 20, his eyes became red and swollen and two days later his face also was swollen. Throughout the illness he had no appetite. During the 7 to 10 days preceding admission his intake had been limited to water and he had developed severe headaches. He had had no muscle aches or pains. Questioned about raw pork, he admitted eating sausage which was "red inside" 20 days before the onset of his illness. His past history was non-contributory and this was his first hospital admission.

*Physical examination.*—He showed evidence of having lost some weight. Temperature 103° F., pulse 120, blood pressure 100/80. The patient looked ill, was dehydrated and restless, and perspired freely. His face was swollen, particularly his eyelids; the conjunctivæ were injected. The abdomen was tender and bowel sounds were present; later in the course of his illness, his liver was found to be enlarged 3 fingerbreadths below the right costal margin and it was tender.

*Laboratory data.*—Urine normal. Hæmoglobin value 96% (15 gm.); red cells 4.9 million; white cells 36,150; differential white count: neutrophils 33, lymphocytes 5, eosinophils 62. Kahn test negative. Four stool specimens on successive days were negative for ova or parasites including trichinella. Agglutination tests were negative for *Brucella*, *S. typhi* O, and *S. paratyphi* A and B. Daily stool cultures between March 28 and April 1 were negative for pathogenic organisms. Daily blood cultures between March 29 and April 1 were all negative. On April 6, a bromsulfalein test revealed 7% retention of injected dye (5 mgm. per kg.) after 45 minutes. Cephalin-cholesterol flocculation test was 4 plus after 24 hours and 4 plus after 48 hours. Trichinella skin test on March 31 was negative, but two months later was positive. Repeated blood examinations were made: on March 29 the differential white count showed 75% eosinophils. An absolute eosinophil count on the same date showed 1,233 eosinophils; on April 5 there were 27 eosinophils. Biopsy of the right gastrocnemius muscle was done on April 8 or nine days after institution of hormonal therapy, 15 days after admission, 39 days after onset of illness and roughly 59 days after ingestion of raw pork. The report was: "Sections of muscle biopsy showed what appeared to be the remnants of the parasite; about it there is a

\*From the St. Joseph Mercy Hospital, Detroit, Michigan.



diffuse infiltration of eosinophils and lymphocytes. Many foci of inflammatory cells including many eosinophils were noted." This was considered positive for trichinosis.

**Course and treatment.**—For the first seven days in hospital the patient had a severe febrile course with spikes every day of 103.6 up to 104° F. These peaks appeared early in the morning. Oral intake was quite poor until April 4, when his nausea disappeared and he began showing some thirst and appetite. Symptoms of formication were experienced during his stay in the hospital. At first he was given terramycin, one gram a day in divided doses. Symptomatic treatment of the dehydration, perspiration and diarrhoea consisted of intravenous fluids, paregoric and deodorized tincture of opium. He was also given aspirin for headaches. Terramycin was discontinued on March 26. On March 31, ACTH therapy was begun in the form of 25 u./litre of intravenous fluid running at a rate of 15 drops/min. He received 50 u. of ACTH intravenously daily for 3½ days, to a total of 150 units. Then on April 3 the patient was given cortisone orally, 300 mgm. daily in divided doses for three days. The dose was decreased to 150 mgm. per day for the next four days. In the hospital he received a total of 1.6 gm. of cortisone.

The administration of ACTH immediately brought his temperature down to normal, where it remained thereafter. His diarrhoea, which had been severe, was completely alleviated and he felt better. Particular attention was paid to electrolyte balance and there were no complications in that field. There was a concomitant desire for food and water. The oedema of his face and eyelids cleared up, as well as the conjunctival injection. Abdominal cramps and tenderness disappeared. Six days after institution of hormonal therapy there was a decrease both in the leucocytosis and in the eosinophilia. The patient was discharged on April 7 on a dosage of 50 mgm. of cortisone per day, which he received until May 16. The patient had no recurrence of symptoms and regained his strength. He did well on cortisone but on two occasions discontinued it and noted fatigue; he then thought better of it and took it again.

#### CASE 2

A 53-year-old white male who worked as a park maintenance man and was the first patient's brother, was brought to St. Joseph Mercy Hospital on March 28, 1953. For the past two months he had been feeling tired, although his work was easy and had never tired him before. Two weeks before admission he became acutely ill with chills and fever. The chills lasted approximately four days while the fever and malaise persisted until admission. Unlike his brother, he had no acute symptoms, or nausea or vomiting. Approximately six weeks previously there had been an episode of frequent bowel movements productive of soft stools which lasted until admission. There had been no weight change. Two weeks previous to admission he noted a decrease in appetite. He had had gout for the last two years. When questioned, he stated that he had many times ingested poorly cooked pork.

**Physical examination.**—He was in no acute distress. Temperature 100° F., pulse 85, blood pressure 140/85. There was periorbital oedema. Chest examination revealed wheezing sounds bilaterally with coarse rhonchi. This was explained as chronic exacerbative bronchitis. His liver was enlarged 4 fingerbreadths below the right costal margin, smooth and non-tender. A complete physical examination was otherwise negative. The impression on admission was of gastroenteritis of undetermined origin, with cirrhosis of the liver. A diagnosis of trichinosis was also entertained here.

**Laboratory data.**—Hæmoglobin 81.5% (12.6 gm.); red cells 4 million; white cells 12,700. Differential white count: neutrophils 65, lymphocytes 13, eosinophils 22. The urine was normal. NPN 35.4 mgm. %, Kahn test negative. Blood uric acid was 5.6 mgm. %, total bilirubin 0.24 mgm. %. After 45 minutes there was 8.1% retention of bromsulfalein. Three successive daily stool

specimens were negative for ova or parasites. Stool cultures done daily between March 28 and April 1 were all negative for pathogenic organisms; blood cultures were also negative. Agglutination tests: Widal negative; typhoid O and H, paratyphoid A and B, *Proteus* OX19, and *Brucella* negative. Cephalin-cholesterol flocculation test was negative after 24 and 48 hours. Chest radiograph: increased bronchovascular markings. On April 4 his white cell count was 13,550 with 33% eosinophils. Biopsy of the left gastrocnemius muscle on April 8, one day after cessation of an 8-day course of cortisone, 12 days after admission and 26 days after onset of his illness, showed "areas in which muscle fibres were replaced by degenerating muscle tissue and a few leukocytes. The reaction suggested an invasion of parasites but the latter cannot be identified." Trichinella skin test on March 31 was negative, but two months later was positive.

**Course and treatment.**—On March 31, the 3rd hospital day and 17th day of illness, the patient began having muscle pains. His bowel movements were regular and he became afebrile on the 4th day after admission. On April 6, he had recurrence of muscle pain and felt weak. As his cortisone dosage had been decreased, it was raised again and he felt better. Treatment was instituted as follows: On March 31, oral cortisone was started, 100 mgm. three times a day. On April 3, the dosage was decreased to 50 mgm. three times a day. When muscle pains and malaise reappeared on April 6, he was given 75 mgm. three times a day and felt better. Cortisone was discontinued on April 7. The patient went home on April 9. He had received 1.6 gm. cortisone in eight days.

This patient had much milder symptoms than Case 1. It is believed that he suffered a milder infestation of *Trichinella spiralis*. He also had portal cirrhosis of the liver. We believe the course of his illness was shortened and alleviated by cortisone. The exacerbation of muscle pains on decreasing cortisone and their remission on increasing it corroborate the findings of Rosen.<sup>3</sup> The disappearance of periorbital oedema and fever, and the increase of appetite, strength and well-being seemed to have justified the use of cortisone in Case 2. We note here that eosinophilia following cortisone increased slightly and leucocytosis for all practical purposes remained unchanged. We also note that there was very little myositis in the microscopic section, a finding which may or may not have been attributable to cortisone. This was also noted in a case studied by Davis and Most.<sup>2</sup>

#### CASE 3

A 50-year-old white male factory worker was brought to Detroit Memorial Hospital on April 29, 1953. About two months previously, he ate poorly cooked and raw pork several times. Five weeks before admission he noticed the onset of watery diarrhoea and sore throat. At first the diarrhoea was slight but gradually became worse and persisted to the time of admission. There was no melæna, blood or mucus. Although he was able to eat, his appetite was poor. He had lost 15 lb. in the past month. There had been no vomiting but he suffered from nausea and "pains in his stomach." The onset of this illness was characterized by chills and fever. He saw a doctor, who did some tests outside the hospital and gave him penicillin and sulfonamides. When he showed no improvement and the diarrhoea persisted, hospitalization was advised. He had muscle aches and cramps in various muscle groups during the course of this illness. Previous history was essentially non-contributory.

**Physical examination.**—He appeared ill but the general physical examination, including introduction of sigmoidoscope for 17 cm., was entirely negative.

**Laboratory data.**—On April 27, hæmoglobin 15 gm.; red cells 4.7 million; white cells 30,400. Differential white count: neutrophils 18, lymphocytes 17, eosinophils 65. Urine normal; Kline test negative. Skin test for trichinella was negative; stool cultures were negative for pathogenic organisms; stool examinations for ova and parasites were negative. His course in Detroit Memorial

Hospital was afebrile; his diarrhoea persisted. Malaise and weakness also continued. He was discharged on April 30.

The patient was admitted to St. Joseph Mercy Hospital on May 3. The history of previous admissions was reviewed and trichinosis appeared to be the most likely diagnosis. He was now complaining of shortness of breath, he had had two episodes of vomiting, and his symptoms were becoming worse. He also had been having abdominal and generalized muscle pains plus diarrhoea.

*Physical examination.*—Weight loss was noted; there was also profuse sweating, mental confusion and early evidence of portal cirrhosis of the liver. There were telangiectasiae. The liver was enlarged to some 2 finger-breadths below the right costal margin. There was no fever. A complete examination was otherwise negative.

*Laboratory data.*—On admission to St. Joseph Mercy Hospital, haemoglobin 100.5% (15.56 gm.); red cells 4.8 million; white cells 21,100. Differential white count: neutrophils 27, lymphocytes 23, eosinophils 50. Urine normal; Kahn test negative. ECG was normal and none of the changes considered compatible with trichinosis were found.<sup>2,3</sup> Biopsy of the right deltoid muscle on May 6 showed "no inflammatory component, nor were there any trichinellae present."

*Case and treatment.*—Oral cortisone therapy was instituted on the day of admission. For the first two days the patient received 100 mgm. three times a day. On May 5, the dosage was decreased to 50 mgm., and on May 7 to 25 mgm. three times a day. On May 10, the patient was discharged and put on 50 mgm. of cortisone per day. On the second day of therapy marked improvement was evidenced. The shortness of breath disappeared, diarrhoea stopped, and malaise and muscle aches disappeared. He began regaining strength. His appetite improved and he looked better.

Although this man did not have a positive biopsy specimen at the deltoid site, we feel that we might have had a positive biopsy specimen from a site where he had muscle pain. Clinically, Case 3 was considered as trichinosis but we were unable to get his consent for another biopsy.

## DISCUSSION

From the ingested cysts, adult male and female trichinellae develop in five to seven days. The majority of larvæ deposited by the adult female, lodged in the intestinal wall, reach the intestinal lymphatics or the mesenteric venules and become distributed throughout the body.<sup>14</sup> This may go on for 4 to 16 weeks or more, as long as the mother worms are alive.<sup>15</sup> Moreover, at least 1,500 progeny are discharged by each female worm, although all of the larvæ do not mature into encapsulated organisms. The larvæ reach the arterial circulation between the 9th and 23rd days. They may become lodged in myocardium, brain, or cerebrospinal fluid, as well as other body cavities from which they re-enter the circulation later and finally reach striated muscle where they will encyst (Matoff<sup>14, 16</sup>). The greatest invasion is in glycogen-poor muscle. The effects of *Trichinella spiralis* are reviewed below and the effects of the hormones on these three states studied.

1. *Invasion stage.*—The larvæ (ingested) penetrate the duodenal and jejunal mucosa. The greater the number, the greater the trauma and irritation of the involved epithelium. Our patients, especially the first and third, had such a phase that was prolonged and overlapped the second and third stages. This was characterized by nausea, vomiting, diarrhoea, colic, profuse sweating and fever. All these symptoms were quickly alleviated by the hormones.

2. *Larval migration stage.*—With infiltration in the muscles, there are rheumatic-like muscular pains which were mild in our cases, but have been excruciating in others. Also, during this stage, there is oedema of the face, particularly the eyelids, and some psychic changes, as noted in Cases 1 and 3. Splinter hæmorrhages (not noted in our cases) may occur. It is felt that many of the symptoms in stages 1 and 2 are caused by an allergic response of the host to the offending trichinella. All the bad aspects of the infestation are not due to damage to the host by the trichinella or to production of toxin by the trichinella (Gould reviews the pros and cons in his monograph, 1945), but are rather caused by the host's own violent defence mechanisms. Harrell and Aikawa and their group published some interesting observations in 1951<sup>8, 9</sup> on the early changes in the organism during infections and infestations. Their study tends to show an alteration in the permeability of membranes early in the course of these illnesses. Further observations suggest the possibility that immunological mechanisms may play some part in the physiological disturbances associated with the disease.<sup>8</sup> Thus, the first and second stages of trichinosis would, in a great majority, represent a strictly allergic response. Knowing the effects of ACTH and cortisone on inflammation, their effects here were predictable. The suppression of toxæmic reactions in the host by cortisone and ACTH may decrease the poisoning of the intracellular enzyme systems, which are incriminated for the alterations in permeability of capillary wall and cell membranes. On the other hand, the hormones will probably not affect the number of organisms or their invasion of the muscles or even their encystment.<sup>1</sup> There is no evidence to show that the mere presence of cysts in the muscles of an individual is detrimental to his well-being or will be harmful to his health, and the larvæ have not been proved to cause any actual lysis of muscle outside of their own en-



cystment. The mortality rate from trichinosis is approximately 6%. In man, five larvæ per gram of body weight can produce death, but as many as a thousand larvæ per gram of body weight have been recorded in persons who died of other causes (Gould, 1945). Therefore, even though we have no drug to eradicate *Trichinella spiralis* in man, we have two hormones which by suppressing the host's reaction to the parasite make the latter relatively innocuous.

3. *What are the effects of cortisone and ACTH upon the period of encystment, the third stage?*—This period again is overlapped by the second state. There may be cachexia, toxic œdema or extreme dehydration. Peripheral vascular collapse may supervene. There may be neurological disorders.<sup>13</sup> The patient may, therefore, succumb to toxæmia. The latter term is used in its general sense, as there is no definite proof that a toxin is elaborated (Gould, 1945); it would mean rather a host tissue reaction involving alterations in permeability of membranes throughout the body. The patient may also succumb to myocarditis initiated by invading larvæ,<sup>11</sup> or to complications such as lobar pneumonia, peritonitis, pleurisy or nephritis. It is felt that ACTH and cortisone suppress these changes, as was evidenced in the cases presented here and also in other cases.<sup>1 to 5</sup>

The entire cyst wall formed in the muscles results from host tissue reaction and is in no part secreted by the larvæ.<sup>18, 19, 20</sup> It would be expected from the known effects of ACTH and cortisone that this encystment would be in some way altered. Actually the diffuse myositis is altered by ACTH and cortisone,<sup>2</sup> but there is not enough evidence at hand to state whether encystment is modified by ACTH.<sup>1</sup> In Case 2, following cortisone therapy, one small piece of muscle showed no definite cyst formation. This biopsy was presumably taken 26 days after onset of illness, which admittedly might have been too early. On the other hand, Case 1's muscle biopsy, taken 39 days after onset of illness and 59 days after ingestion of raw pork, showed no definite encystment.

#### SUMMARY AND CONCLUSIONS

Three cases of trichinosis are presented. They were treated with cortisone and/or ACTH. The following were noted:

1. Dramatic alleviation of all symptoms, including alleviation of œdema.

2. Entire suppression of muscle pains in Case 1, where treatment was instituted before the patient developed any pain.

3. Dosage used was smaller than in other cases previously reported.

4. Skin test response was inhibited by ACTH and cortisone, as also noted by other workers, but it became positive later after discontinuation of cortisone treatment.

5. All three cases had altered liver function to some degree. All three may have had cirrhosis of the liver, and in all there was an alcoholic history.

6. An attempt is made to explain the hormonal actions in trichinosis.

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#### RADIOIODINE FOR CARDIAC INCAPACITY

In a total of 50 clinics in the U.S.A., 1,070 patients with intractable angina pectoris or congestive cardiac failure were rendered hypothyroid by doses of radioiodine; in some clinics a single dose of up to 50 mc. was given, but the authors prefer three doses at weekly intervals of 10-20 mc. Of the 720 patients with angina pectoris 75% showed worth-while improvement; of the 350 patients with congestive failure 60% showed worth-while improvement. Most patients can be maintained in a hypothyroid state (B.M.R. -20 to -25%) with this treatment plus a daily dose of 6-30 mgm. of thyroid.—Blumgart, H. L. *et al.*, *J. A. M. A.*, 157: 1, 1955.

## Clinical and Laboratory Notes

### MORPHINE AND ATROPINE MUCATE

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ON THE EVENING of January 19, 1953, at the Toronto General Hospital Dr. McKee reviewed the use of hypnotics and opiates for preoperative preparation of patients. During the discussion that followed Dr. McKee's paper, the question of timing the administration of these drugs arose. As everyone is aware, the advantages sought by suitable choice of premedicant drugs may be lost as a result of improper timing.

Asquith and Thomas<sup>1</sup> suggest that this problem may be solved by employing a mixture of the mucates of morphine and atropine. Since the middle of December 1952, we at the Toronto East General Hospital have employed such a mixture, and this paper will report some of our impressions.

Régnier in 1938<sup>2</sup> noted the variation in activity of any given base according to the acid combined with it. Using narcotic bases, he studied the effect of the formation of salts with two types of acid: (a) phenylpropionic and phenylbutyric acids; (b) gluconic and mucic acids. The salts formed with the first group of acids had an immediate and more profound action as compared with salts formed with the second group, which developed the specific activity of their base slowly.

Eastland in 1944<sup>3</sup> reported that:

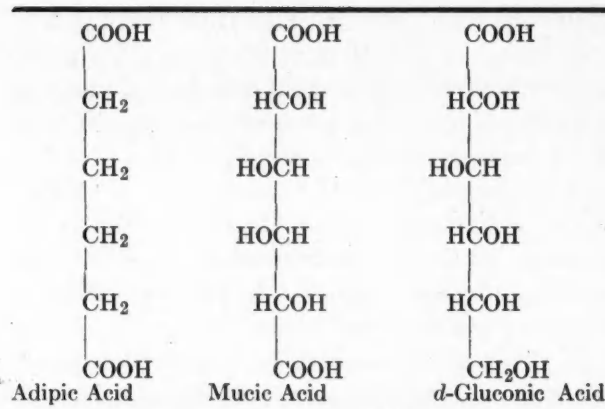
"A search for improved methods of prolonging the effect of the injection of morphine and other narcotics resulted in the observation that, for a given dose of morphine, the period of narcosis can be considerably extended if the base is administered in the form of mucate instead of the usual salts such as tartrate, sulphate, etc. This prolongation of effect is also obtained with the mucic acid compounds of other physiologically active bases such as adrenaline and ergometrine."

Mucic acid is a dibasic acid, only slightly soluble in water (1 in 300). It is a tetrahydroxy-adipic acid and is prepared by oxidation of lactose with nitric acid or by hydrolysis of larch wood and oxidation of the galactose so formed.

Its relationship to adipic and gluconic acids is shown by the structural formulæ at the top of the next column.

Mucic acid is relatively non-toxic, being of the same order of toxicity as tartaric acid.

At the Toronto East General Hospital we have employed morphine mucate gr.  $\frac{1}{4}$  (16 mgm.)



and atropine mucate gr.  $\frac{1}{75}$  in 323 cases. In 211 cases a barbiturate was exhibited one hour before administration of the mucate salts. In this series there were 126 males and 197 females. Fifteen patients (4.6%) were in age group 14 to 20 years; 156 (48.3%) were aged 20 to 40 years; 126 (39%) were aged 40 to 60 years and 26 (8%) were aged 60 and over. The youngest patient was 14 years old, the oldest 74 years. The patients ranged in weight from 95 lb. to 230 lb.

It is apparent that the patients themselves presented considerable variation, not to mention the variables introduced by the surgical procedures undertaken and the various anaesthetic agents (cyclopropane, thiopentone, ether, nitrous oxide) that were employed. It was decided to employ a fixed dose of the mucate drugs until we had gained some experience in their use and could predict their effect with a fair degree of accuracy.

TABLE I.

		TIME ELAPSING BETWEEN ADMINISTRATION OF PREMEDICATION AND ONSET OF OPERATION									
		30 min.	45 min.	1 hr.	1½ hrs.	2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	7 hrs.
No. of cases		7	10	65	32	96	75	16	14	5	3
											Total cases 323

Table I shows the time elapsing between administration of the mucate salts and the onset of operation. It will be seen that there is quite a wide range. Nevertheless the patients arrived in the operating room in an apparently satisfactory state so far as psychic sedation and reduction in secretion of saliva and mucus were concerned. Mild respiratory depression did occur in a few cases, particularly in the older age group. In 12 cases (3.7%) the anaesthetist recorded that he was not completely satisfied with the effects of the pre-anaesthetic medication. However, in only four cases was there a definite suggestion that



the failure of the pre-medicant drugs was related to the time of their administration, i.e., they were exhibited too soon or too late. For the various surgical procedures each anaesthetist administered his customary anaesthetic of choice.

It would appear that morphine mucate assumes some of the burden of anaesthesia. This was particularly noticeable during the administration of thiopentone-nitrous oxide anaesthesia for procedures requiring little relaxation; the anaesthesia was smoother and more easily controlled than that following our customary pre-anaesthetic medication.

TABLE II.

TIME ELAPSING BETWEEN COMPLETION OF OPERATION AND ADMINISTRATION OF FIRST POSTOPERATIVE ANALGESIC

	30 min.	45 min.	1-2 hrs.	2-4 hrs.	4-8 hrs.	8 hrs.	
No. of cases	5	4	50	45	53	166	Total cases 323

Table II shows the time elapsing between the completion of the operation and the administration of the first postoperative analgesic. From the first two columns, it is apparent that in only 9 cases was an analgesic administered in less than 60 minutes after completion of the operation.

The immediate postoperative demand for analgesics is greatly reduced in those patients receiving mucate pre-anaesthetic medication. In most instances the patient was returned to the ward conscious, where he fell into a natural sleep from which he was easily aroused whenever his co-operation was required.

TABLE III.

TIME ELAPSING BETWEEN ADMINISTRATION OF PREMEDICATION AND FIRST ANALGESIC

	4 hrs. or less	5 hrs.	6 hrs.	7 hrs.	8 hrs.	9 hrs.	10 hrs.	10-15 hrs.	15 hrs.	
No. of cases	17	22	17	18	24	21	18	64	122	Total cases 323

Table III shows the total time elapsing between the administration of the mucate pre-anaesthetic medication and the exhibition of the first analgesic.

Postoperative respiratory depression was marked in two instances (0.62% of cases).

Nausea occurred in 24 cases postoperatively (7.4%), and vomiting occurred in 52 cases (16%); that is, nausea or vomiting was present in 76 cases or 23.4% of the series. There was one case of postoperative pneumonia. This was diagnosed three days after operation.

Two patients, who on previous admission for operation had shown an idiosyncrasy to morphine sulphate, exhibited similar reactions following the use of morphine mucate.

#### SUMMARY

1. The mucate salts afford satisfactory pre-anaesthetic medication.

2. Because of their prolonged action they may be administered earlier than the usual salts of morphine and atropine and so allay sooner the patient's preoperative apprehension.

3. Their action is frequently continued postoperatively, so that the patient returns to the ward a conscious and co-operative individual. There has been a marked decrease in the "slugging" of patients with morphine within the first postoperative hour or two since we have employed morphine and atropine mucates pre-anaesthetically.

4. The prolonged action also permits of much greater elasticity in the operating-room schedule and makes for greater equanimity in the operating room and on the ward.

I would like to thank Allen & Hanbury Ltd. for a generous supply of hyperduric morphine and atropine.

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#### SOUTH AFRICAN JOURNAL OF LABORATORY AND CLINICAL MEDICINE

The Medical Association of South Africa has decided to change the name of its publication *The South African Journal of Clinical Science* to *The South African Journal of Laboratory and Clinical Medicine*. This has been done to bring the name into accord with the Association's policy of publishing articles dealing with branches of medicine other than the purely clinical. In pursuance of this policy the Editorial Board has been extended.

The journal will continue to be published four times a year and the subscription remains unaltered at £1 5s. (single copies 7s. 6d.). The office of *The South African Journal of Laboratory and Clinical Medicine* is still at Medical House, 35 Wale Street (P.O. Box 643), Cape Town.

# The Canadian Medical Association Journal

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THE CANADIAN MEDICAL ASSOCIATION

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(Information regarding contributions and advertising will be found on the second page following the reading material.)

## Editorials

### FALLACIES OF PESSIMISM

At this time of year, we could all do with a little cheering up, and any piece of even slightly justifiable optimism is worth recording. Everyone is familiar with the constantly recurring statement that by 1970, or it may be 1980 or 1990, there will be too few productive workers left in the civilized countries to look after the increasing numbers of the aged kept alive by modern medicine. What with this and George Orwell's "1984," there does not seem much chance of the term "the gay nineties" being applied to the end of this century. All but the confirmed pessimists will therefore be grateful to Dr. Lancaster, an Australian statistician, for allowing cheerfulness to break into the gerontological gloom.

Lancaster (*M. J. Australia*, 2: 548, 1954) has been examining the situation as regards the Australian population, and no doubt his remarks will have some bearing on the Canadian population as well. He shows the absurdity of considering the economic aspects of aging without also considering the other types of dependency existing in a population. In this respect, he examines four classes of dependent: the aged (over 65), the young (under 15), orphans, and invalids. It is true that the aged tend to be a charge on the State, whereas the young are more a charge on the family, but in the last analysis someone in the community has to pay for every non-productive worker. Lancaster divides the population of Australia into three groups: (1) under 15; (2) 15 to 64; (3) 65 and over, and sets out the proportions of these from 1881 on to 1947. He shows that, for males, although the per-

centage of aged has increased from 2.84 to 7.43 since 1884, the percentage of productive workers has actually increased from 62.93 to 68.50, because the proportion of young persons has dropped from 34.2 to 24.07%. The trend is even more pronounced in females. Hence there are, relatively speaking, fewer mouths to feed in the non-productive age groups than there were over 70 years ago.

When he deals with orphans, Lancaster is even more cheerful. The rate of orphanhood in Australia has fallen phenomenally, since fathers and mothers are living longer. Whereas in 1891 to 1900, 10% of children born could expect to lose their father by the age of ten, only 2.6% of the 1947 group will encounter this misfortune. The economic inference is obvious.

As regards invalid dependency, there are few satisfactory figures for Australia and not many elsewhere. Lancaster notes the tendency to assume that modern medical science is saving lives and creating more invalids as a result. He finds this theory unwarranted. Practically all the improvements in treatment in recent years have mainly affected younger people. Examples of conditions in which modern treatment has lowered subsequent invalidity are scarlet fever with lessened incidence of nephritis, and acute respiratory infections (as in measles and whooping cough) with lessening of subsequent chronic bronchitis and bronchiectasis. The improved treatment of traumatic conditions, such as burns and fractures, must also have lowered the incidence of the crippled. Though in some other conditions such as tuberculosis the lowering in invalidity is more problematical, there are sufficient grounds to view with scepticism the belief that the doctors are simply keeping corks alive. And even if they are, the modern trend towards rehabilitation has revolutionized thinking on corks, who are now made to lead a satisfying working life instead of mouldering away.

Lancaster does not discuss the probability that fewer married women and widows are financially dependent than formerly, but there is little doubt that this factor must also be lowering dependency in a population.

We would like to see a similar study for Canada, in the hope that we will be able to echo Lancaster's summing up, "Reasons are given for believing that a far too pessimistic view is taken of the aging problems."



## Editorial Comments

### MEDICAL TV

The increasing number of television programmes with medical themes is a phenomenon to which the medical profession should give serious thought. That concern regarding this matter is by no means confined to our profession is shown by a recent article in *The New York Times* and an acid commentary in *The New Yorker*.

Why have these programmes been offered to the public? We are referring, of course, to the general programmes and not to the few experiments in postgraduate medical education through the medium of television. In other words, we are discussing programmes presumably aimed at the adult lay audience. The multiplicity of such programmes makes it obvious that they are attractive to a large section of the public.

What is this attraction based upon? Probably on one or more of several factors. First, we may put the desire for knowledge. This is certainly a legitimate desire, but its fulfilment must be approached extremely cautiously. A physician in the quiet of his consulting room has an opportunity to assess his or her patient and decide how best to present facts and advice. Such a relationship, of course, is absolutely lost in a television programme. Indeed the injudicious use of this medium for mass communication could result in serious inroads into the patient-doctor relationship. None knows better than the doctor the ability of patients to misinterpret what he tells them and their ability to draw incorrect conclusions; none knows better the mental disturbance that can be caused by incomplete or, indeed, actual knowledge of medical facts. Truly here a little "knowledge" may be a dangerous thing. Nevertheless, acquainting the public with the increasing field of service available to them would seem to be the most cogent reason for the participation of the medical profession in such programmes.

A second factor would appear to be morbid curiosity. This is a reason which should receive no support from our profession. Surely the operating and delivery rooms should remain sacrosanct, and not serve to appease the curiosity of unwholesome seekers after vicarious thrills. It is precisely this aspect of some programmes which is drawing adverse comment from the press.

The third reason that might be given would be the desire for entertainment. This is, of course, quite outside the sphere of our profession and should not interest us.

A final factor that could be suggested is the use of television for the exhibition of material of value as propaganda. An organized group such as ours, united in the pursuit of a learned art as a public service, should not have to countenance such use.

We could conclude that while television programmes of a medical nature are of educational value, such sensational devices as shots of actual operations or deliveries have no place in these programmes. The development of antibiotics, or some of the reasons behind the placing of certain drugs on a "prescription only" basis, might, for example, be suitable subjects for television. Realization by the laity that there has been careful consideration prior to our public actions, and that such actions are never aimless, would be of definite value to our profession.

All of this brings us back to our basic problem: why do we have these programmes, and what should our attitude to them be? Medical television programmes must serve one or both of the following purposes: health education of the public, or improvement in the relations between doctor and patient. If they do not, they are bad programmes. If they do, they still do not absolve the general practitioner from his duty to educate his patients in matters of health, and to maintain an atmosphere of mutual trust and understanding between the profession and the public. No TV programmes can do this for us.

STUART GORDON

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### CARCINOGENS IN CIGARETTES

Under this heading the *British Medical Journal* (2: 1213, 1954) comments on recent work by London University chemists on carcinogens and smoking. Cooper, Lindsey and Walker, the chemists in question, announced the identification of the notorious carcinogen, 3:4-benzpyrene, a polycyclic hydrocarbon, both in tobacco smoke and in the smoke from cigarette papers. They calculate that an individual smoking 40 cigarettes a day would take in 150 micrograms of benzpyrene in a year, and possibly another 200 micrograms from an average urban atmosphere. In assessing the possible degree of harm done by carcinogens from these two sources, they mention that the atmospheric benzpyrene may be adsorbed on carbon particles and therefore relatively inactive. It is difficult to give a quantitative picture of the risk from inhalation of these amounts of carcinogen, since the resistance of human respiratory epithelium to the carcinogenic stimulus of benzpyrene is completely unknown, but the fact that this substance is constantly being inhaled by smokers must give food for thought.

There is another thought not mentioned in the above commentary, namely that the chronically inflamed respiratory mucosa of the heavy smoker may be more readily affected by benzpyrene than the relatively intact mucosa of the non-smoking town dweller.

## SIR ARTHUR KEITH

We regret to announce the death of Sir Arthur Keith, the distinguished anatomist and anthropologist. A rugged Scot, born on a farm near Aberdeen, Sir Arthur began his medical career as a general practitioner, passed on to the teaching of anatomy at the London Hospital Medical School, became Hunterian professor at the Royal College of Surgeons, London, and ended his life still in harness at the age of 88, as Master of the Buckston Browne research farm near London, England.

His work was best summarized by the late Lord Moynihan, who said of his re-shaping of anatomy, "The valley of dry bones, thanks to him, is full of living men."

## ANTICOAGULANTS AGAIN

We had occasion to comment in these columns recently on the differences of opinion in England regarding the use of anticoagulants to prevent thromboembolic complications in coronary thrombosis. It is clear from papers read in a panel discussion at the annual meeting of the American Medical Association, and now reproduced in the *Journal of the American Medical Association* (156: 1127, 1954), that American cardiologists are also by no means unanimous on the virtues of this treatment.

This may come as a surprise to those who have read the very detailed and important study on 1,031 cases of myocardial infarction treated in two series, 589 by anticoagulants and 442 without. In this monograph (*Myocardial Infarction*, I. S. Wright *et al.*, Grune and Stratton, New York, 1954) a team led by Dr. Wright concludes that anticoagulants significantly reduce the incidence of both extracardiac and intracardiac complications, and pronounces in favour of their use in all cases of myocardial infarction.

On the other hand, Schnur (*J.A.M.A.*, 156: 1127, 1954) takes a very different view. He deals with the problem in the form of question and answer. Among the points made in his paper are the following. The American Heart Association has never officially recommended routine anticoagulant therapy in myocardial infarction, or taken any stand in the controversy. Schnur thinks that mortality rates in myocardial infarction vary widely and that such variations may incorrectly be attributed to treatment; he also thinks that there is a tendency to publish the favourable results and to forget about series in which the result was unfavourable. He stresses the lack of uniformity of opinion among cardiologists, members of the committee for the study of anticoagulants and members of the scientific council of the American Heart Association. He thinks that patients seriously ill on admission should

receive anticoagulant therapy, and in general the older age groups. Failure to give anticoagulants should not be regarded as malpractice, however. He draws attention to the error which arises when clinicians assume that post mortem findings accurately reflect disease in the living state, and also to the errors arising when cases seen by consultants are assessed, since the consultant sees only the difficult, unusual or complicated cases. He suggests that anticoagulants are directly contraindicated in blood dyscrasias with tendency to bleeding, wounds with open, raw surfaces, ulcer and cancer of the gastrointestinal or genitourinary tract, liver disease and jaundice, among other conditions. The use of anticoagulants is advocated if thrombo-embolism should occur during the course of the disease, though he does not consider that our knowledge of the process of thrombosis is very good. He deprecates the view that the problem of prophylactic anticoagulant therapy will be solved if and when an ideal anticlotting agent is found.

Schnur's views are backed up by a shorter paper given by Russek and Zohman (*ibid.*, 156: 1130, 1954), who conclude that anticoagulant therapy is neither necessary nor desirable for that large group of patients undergoing their first attack of acute myocardial infarction and having no unfavourable prognostic symptoms or signs at their first examination. If, however, unfavourable signs appear, anticoagulant drugs should be used at once. In all, about 30% of all patients with myocardial infarction require anticoagulant therapy.

## BOXERS' BRAINS

We have always been slightly critical of the view that the average professional boxer gradually degenerates into a punch-drunk state, with his brain riddled with multiple petechial haemorrhages. The common view that intracranial trauma is responsible for the deplorable mental state of some burnt-out fighters smacks of *post hoc ergo propter hoc*. Would these middle-aged men be any more intelligent if they hadn't been beaten up, or would they have allowed themselves to be beaten up if they had been more intelligent?

We have been even more critical of the view that the majority of blows struck for money rather than in anger cause severe damage to the person struck. We are therefore glad to see concrete evidence in a paper by Kaplan and Browder (*J.A.M.A.*, 156: 1138, 1954) that most boxers really do not harm each other to the extent that movie fans would imagine. Under the auspices of the New York State Boxing Commission, Kaplan and Browder studied the clinical condition and brainwave patterns before and after fights in the case of 1,043 professional



fighters. This group included all sorts and conditions of fighting men—sluggers, boxers in the proper sense, young men, old men, boxers on the way up and boxers on the way out. The thing that struck the observers was that relatively few blows in any single fight were really effective. They assumed that in an average ten-round bout approximately 1,000 punches are struck to various parts of the body. They asked Jack Dempsey about the number of effective head blows sustained by a boxer in a single fight, and his answer was that possibly one in 1,000 hit the mark, though some boxers are more susceptible to being knocked unconscious than others. They note that in a series of 100 consecutive professional bouts only four knockouts were registered, but in each case the fighter recovered promptly and was able to leave the ring unassisted. When they came to study the electroencephalograms of boxers a number of surprising findings came to light. The sluggers, who by definition receive more head blows than skilful boxers do, had no more abnormal records than anyone else. Indeed, the over-all pattern of the electroencephalogram in professional fighters seemed to have no distinguishing features from that in a group of the peace-loving populace. They cited the case of one fighter with 370 bouts to his credit whose electroencephalogram is completely normal and who has no neurological abnormality detectable on examination. We may mention for comparison a British paper by Blonstein and Clarke (*Brit. M. J.*, 2: 1523, 1954), who studied the electroencephalogram in 48 amateur boxers and found a diffuse slowing of rhythm in four of a group of 24 who had received one or more recent knockouts. They note, however, that their subjects were adolescents, and that in this group normal maturation defeats may cause confusion in interpretation of EEG tracings. Like their New York colleagues, they cannot decide on the role of the EEG in making boxing safer.

Although Kaplan and Browder state quite clearly that professional boxing is by no means a mild sport, and by no means free from physical risk, they have come to the conclusion from their studies that severe brain damage is comparatively rare, unless the fighter has the misfortune to fall on the back of his head.

#### DEATH OF A JOURNAL

With its issue of November 1954, the 39-year-old *American Journal of Syphilis* discontinued publication, leaving the *British Journal of Venereal Diseases* as the sole periodical in English in this field. The fall in incidence of venereal disease in Anglo-Saxon countries and the ease with which it can be cured have combined to lower interest in these maladies, though

as Earle Moore points out in his final editorial, the really basic problems relating to syphilis, such as the successful growth of virulent *Treponema pallidum* on artificial media, or the development of a practical and really specific diagnostic test, are still unsolved. Perhaps we shall live to see the day when journals devoted to other diseases follow this excellent publication to the Valhalla awaiting periodicals which have faithfully served their time.

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#### CANADIAN SERVICES MEDICAL JOURNAL

Study of the concluding number of the first volume of the *Canadian Services Medical Journal* brought the sudden realization that the *Canadian Medical Association Journal* had perhaps failed in etiquette by making little or no reference to the advent of this new journal in July 1954.

The present time, with the first volume successfully completed, seems as good a moment as any at which to draw the attention of our readers to this useful publication. The *Canadian Services Medical Journal* is the successor to the old *D.V.A. Treatment Services Bulletin*, but succession does not imply in this case simply continuation under a new name. The new journal is jointly sponsored by the Departments of National Defence, National Health and Welfare, and Veterans Affairs, and is designed for publication of articles not only by authors in these departments but also by medical writers outside Federal employment. Thus, for example, the December issue contains two articles by physicians not primarily concerned in government work. In the six months of its existence, the journal has covered a wide range of topics—administrative, medical, surgical, psychiatric, nutritional and biochemical. Its presence reflects the tendency to integrate the work of various government and service departments concerned with health, a tendency manifested in the United States a few years ago when the *U.S. Armed Forces Medical Journal* replaced separate service journals. We hope that at the end of 1955, the editor of the *Canadian Services Medical Journal*, Dr. A. H. Neufeld, will be able to record a continuation of the steady progress made in 1954.

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#### RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN

The William Gibson Research Scholarship for Medical Women, value £200 per annum for two years, will be awarded in July 1955, to date from October 1955, to a qualified medical woman (British subject) selected by the Scholarship Committee. Applications should include schedule of proposed research, two testimonials, and statement of professional training and appointments, and should reach the Secretary, Royal Society of Medicine, 1 Wimpole Street, London, W.1, England, by June 1955.

## Men and Books

### MEDICAL MEN AND CREATIVE WRITING\*

T. F. ROSE, M.D., Victoria, B.C.

A TABULATION OF DOCTORS who have written outside their field would be encyclopædic, purposeless, and dull. Instead I propose to make fuller notes on those medical men who have contributed substantially to the writing of their day, whether of enduring influence or not. Having little notion, when I began, of the material to be uncovered, it seemed interesting to find what sort of doctors made what sort of writers. In general, the doctor had better keep his head out of the clouds; the writer should not plant his feet too firmly on the ground. In medicine we are concerned, so far as possible, with orderly assessment of facts, leading to logical conclusion. How far is this discipline compatible, in the same personality, with the inventive imagination, however disciplined in its expression, of creative writing? How many of us have succeeded in practising both arts? Here are some who have tried.

*Thomas Linacre*, 1460-1524, became at Oxford one of the first Greek scholars in England before studying in Italy, where he received his doctorate in medicine with distinction from the University of Padua. Called to London as tutor for the royal princes, he was soon appointed King's Physician by Henry VIII. For the next twenty years he numbered most of the great men of the day, including Cardinal Wolsey, among his patients.

His only medical writing consisted in English translations of six treatises by Galen. But he produced essays on philosophy, natural history and mankind in general, which exerted great contemporary influence, while his style marks him as one of the masters of our language. He was responsible in 1520 for founding the Royal College of Physicians, became its first president, located in it his house, and gave it his library.

*François Rabelais*, who was born in Touraine about 1490 and died in Paris about 1553, obtained his classical education as a young friar. In 1530 he was given permission by the Pope to study medicine, and received his degree from Montpellier. He was one of the first men in France to dissect the human body. Over the years he taught and lectured in Montpellier, Lyons, Paris and Rome. He was physician to several nobles and cardinals whom he accompanied on their travels. He edited the *Epistles* of Giovanni Manardi, the *Aphorisms* of Hippocrates, and the *Ars Parva* of Galen. This writing was done during the same few years when he published his romances of *Gargantua* and *Pantagruel*.

Rabelais is distinguished for the jovial boisterous sting of his satire, the gusto with which he demolishes those political, social and religious characteristics of the Middle Ages which offended him as a man of the new learning and new freedom which was to be known as the Renaissance. He remained a Benedictine monk in good standing, while mercilessly lampooning the monastic system. He is remarkable for the delight he takes in learning, bombarding his readers with broadsides of fact and philosophy, sustained above tedium by his intoxication in the use of words.

But Rabelais, who wrote in an age of very blunt talk, has survived oblivion chiefly because of a quality which his writings in fact do not have. He has become a byword for licentiousness and voluptuousness. Generations of men, who have never read a word he wrote, are compelled to greet his name with rolling of the eyes and knowing smirks, in evidence of their virility. Actually, the aspects of Rabelais' stories which make him unsuitable for the children's hour rarely escape long enough from the privy to venture into the bedroom. His hero Pantagruel is a sort of mediæval Paul Bunyan, whose province is not the forest but the barnyard. He drowns hundreds of enemy soldiers in his urine; when he breaks wind the ground trembles for nine leagues about; when he is costive he swallows eighteen men with shovels and baskets to dig him clear. Much of Rabelais' humour is based on such crude exaggeration that our contemporary comic strips are subtle by comparison, while his smut is exceeded in finesse on the lavatory walls of any of our better schools.

*Sir Thomas Browne*, 1605-1682, completed both his classical and medical education at Oxford when he was twenty-one, took his M.D. from Leyden, and returned home to private practice. A few years later he had completed the *Religio Medici*, an extraordinary volume of original criticism of the Catholic faith. This monument of scholarship and philosophy was written by a practising physician before he was thirty years old, and entirely as a personal exercise in sharpening his wits: it was not until four years later, when a friend published a garbled version of the manuscript, that he brought out a correct edition.

Browne lived in an age of transition, when the new learning was pushing up through the mouldy leaves of classicism, and he typifies its contradictions: a few years after the appearance of a book which has remained a milestone in progressive thought, two wretched women in Norwich were put to death for witchcraft, largely on evidence supplied by Browne!

Throughout his life he continued to write imaginative essays, philosophy and natural history, all in a prose style which has seldom been bettered, while the final passage of his *Urn Burial* is one of the most resounding bursts of

\*Read at the Annual Meeting of the Canadian Medical Association, June 16, 1954.



rhetoric in our language. But he likewise continued to practise medicine, with a wisdom and humour which is illustrated by this observation from his diary:

"Many have thought it no lost time to exercise their wits in the praise of disease. Some have wittily commended baldness, others extolled the quartan agues, and some have left encomiums of the gout, thinking they extenuate the anguish of it when they tell what famous men, what emperors and learned persons have been severe examples of that disease; that it is not a disease of fools but of men of parts and senses. But none have attempted the encomium of consumption, which it has so well deserved as to this and the other world, giving a merciful conclusion to the one and a solemn preparation to the other. He that prays against tormenting disease or sudden death hath his litany heard in this disease, which is one of the mercifullest executioners of death, whose blows are scars to be felt which no man would be killed to be free of; wherein a man is led, not torn, unto his transition, and may number his days and even last hours, and speak unto his Saviour when he is within a moment of him."

John Locke, 1632 to 1704, revealed his independent thinking and disputatious nature as a student and later instructor in Greek, rhetoric and moral philosophy at Oxford. A tour of the Continent in the diplomatic service awakened his interest in science; membership in the newly founded Royal Society quickened it. At the age of thirty-eight he applied for a medical degree by royal dispensation. This was refused him, not because of lack of qualification but because of his liberal religious views! Four years later, after he had assisted a friend in practice, the degree was granted.

He shortly became a protégé of the Earl of Salisbury, serving as his personal physician, political secretary and confidant. His was a practical age when political labours were rewarded, depending on circumstances, by power, prison or exile—often all three in rapid succession. Locke divided many years between sharing Salisbury's prestige in high council in London, and persecuted refuge in the Low Countries. His later years were spent in the happier position of royal favour.

During most of his political life he practised as a highly respected physician, and spent fourteen years of it rewriting his major philosophical work, the *Essay Concerning Human Understanding*. This treatise alone placed him in the front rank not only of contemporary philosophers but of those who were to fashion the thinking of posterity. Philosophical leaders of several succeeding generations found it necessary either to support or attack his system.

Locke's *Two Treatises on Government*, which justified the revolution of 1688 by denying the divine right of kings, was a major influence in eighteenth century colonial philosophy, guided the fathers of the American Revolution, and is directly quoted in the Declaration of Independence and the American Constitution.

Tobias Smollett, 1721-1771, youngest son of a Scottish laird, was apprenticed to a Glasgow

surgeon at fifteen. During three years of training he wrote a very bad tragedy about the death of James I, armed with which he invaded England, but was so easily repulsed by the London publishers that he had to ship out as surgeon's mate aboard a man-of-war. In this capacity he served throughout the siege of Cartagena in 1741, and later on the West Indies station. Returning to London, he set up as a surgeon in Downing Street, but his practice readily allowed him the leisure to write his first novel, *Roderick Random*, in which he described so vividly the contemporary life aboard British ships that Sir Walter Scott, half a century afterwards, said that later writers about the navy appeared to have copied more from Smollett than from the navy.

Two years later he took his M.D. degree. In the next three years he wrote possibly his best novel, *Peregrine Pickle*, while trying to make a success of practice in the town of Bath. It appeared about the same time as his only professional publication, *A Treatise on Midwifery*. His novel was a brilliant success, his treatise and practice just the reverse, and at this point his association with medicine ended. During the next twenty years he achieved fortune and calumny, fame and imprisonment as a novelist, critic and editor whose satirical shafts were as accurate as they were sharp, whose hostility was savage, and whose disrespect of persons was reckless.

Oliver Goldsmith, 1728-1774, born in Ireland of English stock, was the pock-marked, ungainly son of a poor country clergyman. At Trinity College, Dublin, he developed his lifelong propensity for conventional, uninspired dissipation and improvidence. After a suitable interval of riotous poverty in a garret, he took his bachelor's degree from the bottom of his class. An application to be ordained in the established church met with an unfavourable response when he appeared at the bishop's palace in a scarlet suit. A superficial exposure to chemistry and natural history at Edinburgh was followed by a glancing blow from medicine at Leyden. Thence he made his way about the Continent, playing his flute for hand-outs until, after a brief stay in Italy, he reappeared in England with a rather mysterious medical degree from Padua.

His practice thrived as well as his previous efforts, and before long he was running errands for apothecaries, acting as servant in a boys' school, and simply living as a beggar. From this low ebb, at the age of thirty, he turned to hack writing, producing anonymous works to booksellers' specifications, gradually rising in stature until publication of *The Vicar of Wakefield* brought him popular success. He is best remembered for his poem, *The Deserted Village*, and his play, *She Stoops to Conquer*, though he wrote a great deal more.

Even during his literary heyday he attempted intermittently to practise medicine. Chemists refused to execute his prescriptions because of unorthodox dosages. On one occasion he said

grandly that he didn't practise, he only prescribed for his friends. His companion replied, "Pray, dear doctor, alter your rule and prescribe only for your enemies." At the age of forty-six he became ill, then committed his crowning indiscretion of prescribing for himself. He died at the height of his fame.

Everyone remembers *Jean Paul Marat*, born in 1743, for being stabbed to death in his bath in 1793; nearly every one can identify him as one of the more relentless leaders of the French Revolution. But few people know him as a respected philosopher, engaging in controversy with Voltaire, while almost no one now recalls that throughout most of his life he was a fashionably successful physician and well-known physician.

He practised medicine in Paris, Holland and London, taking his M.D. at St. Andrews in Scotland before returning to France, where he became physician to the King's Guard, as well as to many of the aristocracy whom he subsequently sent to the guillotine. In London he published *An Essay on Gleets*, and *An Enquiry into the Nature, Cause and Cure of a Singular Disease of the Eyes*. His work on light, heat and electricity won him election to the French Academy of Science, while its temerity in disagreeing with Newton so offended many of the academicians that they refused to receive him. Of his philosophical works, the best-known was the *Essay on Man*, which established his reputation in that field and was widely translated and discussed throughout Europe.

This distinguished career was flung aside in 1788 by Marat's plunge into republicanism, which sent him underground, literally into the sewers, into exile, into almost dictatorial power, and thence into an intractable dermatitis which sent him into his fatal sitz bath.

*George Crabbe*, 1754-1832, completed his apprenticeship to a Suffolk surgeon, then worked as a day-labourer for several years before spending a year in London studying midwifery. On his return home his practice was a failure and he entered the church, living the life of a country parson while doing most of his writing.

Crabbe's best-known work was in the form of long narrative poems. They earned him the lifelong admiration of the critics and the close friendship of Edmund Burke, Sir Walter Scott and Samuel Rogers. But he was never very popular, either in his lifetime or afterwards. His excellent verse just missed greatness, and he survives only in anthologies.

Unlike his close friend, Goethe, *Johann Frederick von Schiller*, 1759-1805, had more to do with medicine than suited his taste. The son of an army surgeon, he studied medicine at Stuttgart as a protégé of the Duke of Württemberg. The rigid military discipline of the school stimulated in Schiller a rebellion which he expressed in a dramatic tragedy, *Die Räuber*. This was not produced until two years after the poet,

then twenty-one, had qualified as a surgeon and been appointed by the duke as medical officer to a regiment stationed at Stuttgart. *Die Räuber*, staged in Mannheim, and since established as one of the most vital German dramas of the 18th century, was an enormous popular and critical success from the start. Schiller went a.w.l. to see his play, but was discovered, confined to barracks for a fortnight, and forbidden by the duke to write any more "comedies," or indeed to communicate with any one outside Württemberg. His reply to this was flight and exile.

The rest of Schiller's career belongs to letters and not medicine: his early lyric period, best known by the *Ode to Joy*, which Beethoven used for the choral last movement of his Ninth Symphony, gave way to an interval when he wrote history and served as professor of history at the University of Jena. But he returned to imaginative writing, and the last dozen of his 46 years saw a prolific output of ballads and plays in verse, the best-remembered of which are *William Tell*, *Joan of Arc (Die Jungfrau von Orleans)* and the *Wallenstein* trilogy.

*Thomas Brown*, 1778-1820, lived all his life in Edinburgh, where he studied first moral philosophy, then medicine. While a first-year student he published a criticism of Darwin's *Zoonomia*, and in his second year made a reputation by his critique of the philosophy of Kant. In 1805 this medical student successfully defended Sir John Leslie from an attempt to bar the latter from the chair of mathematics at Edinburgh, convincing the senate that the philosophy of Hume, to which Leslie subscribed, was not inimical to religion.

He remained a successful practising physician all his life. His standing as a leading philosopher of his day was established by a series of essays and lectures, and during the last eleven years of his life he was assistant professor of philosophy at the university. In this faculty he lectured on "The Philosophy of the Human Mind," while for the other he published a textbook on "The Physiology of the Human Mind." He wrote a treatise on the anatomy and physiology of the senses, and another on the philosophy of sensory perception. He also published many long poems in the classical manner, now forgotten.

*John Keats*, 1795-1821, was the orphaned son of a livery stable manager. As a schoolboy he was athletic and gregarious until the age of fifteen, when he developed a sudden passion for scholarship. He was well into a translation of the *Aeneid* into English prose when he was apprenticed to a surgeon in the London suburb of Edmonton. After four years of this he enrolled as a medical student, first at St. Thomas' Hospital, then later at Guy's. When he passed his licentiate at age twenty-one he had for two years been writing poetry, and shortly before he qualified he wrote his famous sonnet, *On First Looking into Chapman's Homer*. This brought him the friendship and patronage of Leigh Hunt, whose critical aim



was to replace the "classical" school of poetry with a natural freedom of expression which soon became known, and remained famous as the Romantic Revival.

With Hunt's support, Keats was free to pursue his obvious destiny as a lyric poet, his medical career entirely forgotten. His subsequent work, all of it compressed into a feverish five years, is too well-known to require comment here. At the age of twenty-five, he developed pulmonary tuberculosis from which, still working furiously, he died a year later. His biographers, not medical men, note with surprise that the young doctor did not recognize his own disease. With more experience in the obtuseness of physicians about their own health, we may be less inclined to assign Keats' diagnostic lapse to professional inexperience. After all, Sir Thomas Lewis is said, on his deathbed, to have called Himsworth a fool for trying to tell him he'd had a coronary attack.

Eugene Sue, 1804-1857, served as a naval surgeon in the Spanish campaign and at the battle of Navarino in 1828. When his father left him a fortune, he returned to Paris and wrote two novels using his naval experience as a background, the first of these being a mere pamphlet of two volumes. His next twenty years produced a steady flow of serious and ponderous novels, several of them preaching a drawing-room brand of socialism, and testing the reader's endurance in from four to sixteen volumes. His best-known was *The Wandering Jew*, who had sufficient stamina, after wandering through ten volumes, to wander on to the stage and persist there for a good many years.

Oliver Wendell Holmes, 1809-1894, published a volume of poetry shortly after graduating from Harvard Medical School. During the next quarter century, as a celebrated wit and conversationalist, he wrote a scattering of graceful essays and poems, but was chiefly occupied with his profession. Fortunately this gay and brilliant young man was not a success in private practice; Bostonians preferred their physicians grave and serious. He turned to lecturing in anatomy, then shortly produced papers on malarial fever in New England and on the delusions of homoeopathy. In 1843 appeared his paper on *The Contagiousness of Puerperal Fever*, which brought him at first bitter abuse, then lasting reputation. At thirty-eight he became Professor of Anatomy and Physiology at Harvard. The students were always sent to Holmes at the end of the day when they were tired, as only his sparkling lectures could keep them awake. His scientific articles were similarly distinguished for liveliness, wit and graceful expression—the more so in a nation fallen heir to the Teutonic tradition of solemnity, where doctors wrote English as though it were German.

In 1857 Holmes helped found the *Atlantic Monthly* and gave it its name. During the first two years of publication, the magazine was kept alive by the popularity of Holmes' contributions,

later published as *The Autocrat of the Breakfast Table*. Subsequently there appeared *The Professor at the Breakfast Table* and *The Poet at the Breakfast Table*. From this time, except for continuing his lectures at Harvard, he gave most of his attention to literary matters. Of three novels which he subsequently published, none is read today.

The Breakfast Table series, for which Holmes is best remembered, are brilliantly witty and urbane little essays, in which every conceivable subject is treated with the inimitable Holmes' blend of scholarship, wisdom and humour.

John Brown, 1810-1882, practised all his life as a leading Edinburgh physician. He wrote two volumes of essays: *Horæ Subsecivæ*. A small volume reprinting two of these essays, one about a dog and one about a little girl, entitled *Rab and His Friends*, was a best-seller in his day and popular long afterwards.

Claude Bernard, 1813-1878, reversed the pattern which is becoming familiar in this survey. During his adolescent years as a druggist's apprentice in Lyons, he composed a musical comedy, *The Rose of the Rhone*, which met with such success that he next wrote an historical tragedy in five acts and set off with his manuscript to seek his literary fortune in Paris. The noted dramatic critic, Girardin, read his play and advised him to study medicine. It is fortunate that he took this advice; he went on to become one of the founders of modern physiology. He was the first incumbent of the chair of physiology at the Sorbonne, and the first scientist to be given a state funeral by the French government.

Silas Weir Mitchell, born in Philadelphia, in 1829, took his M.D. from Jefferson Medical College at twenty-one, and did general practice until service in the Union Army stimulated an interest in diseases of the nervous system. At the same time, in 1863, he published in the *Atlantic Monthly* an excellent short story based on a physiological and psychological problem, which touched off his writing career. For the next half century he played the double role of distinguished physician and eminent man of letters.

His professional contributions number more than a hundred original papers; his work on nervous disorders brought him international recognition and a lasting place in the history of medical progress; the condition of acrocyanosis, which he first described, has been given his name. His popular reputation, which was great, came from his advocacy of the "rest cure"—a phrase which he coined—and his book, *Wear and Tear, or Hints for the Overworked*, was a best-seller. His observations on neurasthenia were well ahead of his time.

Today, Mitchell's professional work is still respected, while his literary efforts are so well forgotten that it is surprising to realize that the prolific and popular writer overshadowed, in his own generation, the famous doctor. He published

several volumes of verse, several books of prose fiction, two historical novels and many stories for children.

*Johan August Strindberg*, 1849-1912, received a medical education in Stockholm, but made his living as a teacher, librarian and journalist while gaining recognition as a playwright. With his Norwegian contemporaries, Ibsen and Bjornson, he pioneered the movement towards realism on the stage, especially in "problem plays" written around a social issue. In his lifetime he was recognised as Sweden's greatest modern writer, but like so many innovators his work has been overshadowed by later men, and a list of even his best-known plays would convey nothing to most of us.

Of *Henrik Ibsen* himself, who lived from 1828 to 1906, almost nothing deserves to be said in our present consideration. As an adolescent he was apprenticed for four unhappy years to a country apothecary, before escaping to Oslo and his career as founder of the modern stage.

One is justified in passing over *Sir William Osler* with a bare mention. An outline of his life would be simply repetitious, while his two best-known non-medical works, *Aequanimitas* and *A Way of Life*, are almost obligatory reading for Canadian medical students. Those who read him before their judgment was mature may be assured that his clear and graceful prose is a worthy vehicle for the humanity and wisdom which distinguished him as an essayist as well as a physician.

*William Henry Drummond*, born in Ireland in 1854, was brought to a Quebec timber village as a small boy, where he grew up among the *habitants* and *voyageurs* whom he was to characterize so genially. He attended McGill College, but took his medical degree from Bishop's Medical College in 1884. After interning one year at the Western Hospital in Montreal, he did country practice in the Townships for four years, before settling finally in Montreal and continuing in a very heavy practice until shortly before his death from cerebral haemorrhage at the age of fifty-three. He also served as Professor of Jurisprudence at Bishop's College. His poems were the product of his almost non-existent spare time.

Previous writing about French Canadians had generally been literary in a stilted vein, condescending, or plain bawdy. Drummond was intimate all his life with the up-country *Canadien*; he understood him well and enjoyed his company without superiority. Leaders among the French Canadians themselves were prompt to acclaim Drummond's dialect poems as accurate and kindly interpretations of the character, life and outlook of the *habitant*. They are full of gentle humour, though in many of them the sentiment of the turn of the century would, in our generation, be called sentimentality. In any case, Drummond's verse was immensely popular far outside

Canada, and is still widely read half a century later.

The omission of *Havelock Ellis* from this list may be questioned. He qualified in medicine, in preparation for his studies in psychology and sociology. He wrote with such brilliance and wit that he was distinguished for this alone, but his work was confined almost entirely to his professional field.

*Sir Arthur Conan Doyle*, 1859-1930, was the son of one artist, and the nephew of another who designed the cover which *Punch* still uses after a hundred years. He took his M.B. from Edinburgh at twenty-two and his M.D. four years later. Nearly starving in general practice, he became an oculist, and to occupy the time while waiting for patients who never came, he began to write. In four years he published six scholarly and readable historical novels, which made his reputation and emancipated him from his empty waiting room.

Prompted by a boyhood fascination for Edgar Allen Poe's detective hero, M. Dupin, he undertook a similar sort of story, with an intricately exact plot, in which criminals were discovered through logical deduction. His hero was modelled after a long, lean, angular surgeon named James Bell, who had taught Doyle at university, and whose hobby was diagnosing the occupation and character of his patients as well as their disease. This hero was christened after a famous contemporary cricketer named Sherlock, and the eminent Oliver Wendell Holmes. The creation of a dull little man to serve as a foil to Holmes' brilliance was a necessity, but the designation of Watson as a doctor probably reflects Doyle's opinion of the profession which had rewarded his efforts so meagrely. *The Adventures of Sherlock Holmes*, the grandfather of all fiction detectives, require no comment, as they are familiar to all of us.

Conan Doyle wrote other novels and a few plays. Later he turned to history, and published a scholarly account of the Boer War, while his *Cause and Conduct of the World War* has been translated into twelve languages.

*Anton Chekov*, 1860-1904, was born in South Russia and qualified in medicine at the University of Moscow. While still a medical student he became a contributor to humorous magazines, and after graduation his medical practice rapidly gave way to devoting all his time to writing short stories. Although he continued to produce stories and novels throughout his short life, his reputation rests on his plays, among which the best known are *The Cherry Orchard*, *The Sea Gull* and *Uncle Vanya*.

As a public duty he returned to practice in the cholera epidemic of 1892-93, which ended his professional activities. He wrote mostly about ineffectual people, disintegrating under the pin-pricks of environment, and it is said most of his pieces "ended not with a bang but a whimper." He typifies the pessimistic, morbid style of nine-



teenth century Russian literature, of which Thibaudet observed that "a Russian story is always the story of the undoing of a life."

Robert Bridges, 1844-1930, pursued an orthodox and very successful medical career, with only a casual interest in poetry until he was past the age when most poets have done their best work. Then, at thirty-eight, consulting physician to the Children's Hospital in Great Ormond Street and assistant physician at the Great Northern Hospital, he quite suddenly abandoned medicine and devoted the rest of his long life to composing verse.

Most of Bridges' excellent poetry was clear enough to be enjoyed by a wide audience; it brought him popular fame and appointment as Poet Laureate in 1913, when he was nearly seventy. But he was interested in experimenting with new verse forms and means of expression, so that much of his work is obscure to the average reader.

For years he was so absorbed in his great work, *The Testament of Beauty*, that he wrote nothing else, and became known as "the silent laureate." Silent also on a visit to the United States, when he declined to give public readings of his verse, a newspaper headlined: "King's Canary Won't Chirp."

Axel Munthe, born in Sweden in 1857, attended Uppsala University but studied medicine in Paris, becoming the youngest M.D. ever to receive that degree in France. During his post-graduate training in neurology and psychiatry, Charcot described him as the most promising man of his generation. He achieved distinction as a practising psychiatrist, of whom it is reported that Krafft-Ebbing from Vienna sent him many "patients of both sexes and no sex," while from Philadelphia Weir Mitchell handed over "dozens of undisciplined and unhinged ladies of all ages." After some years he became fed up with the vapours of the carriage trade, and retired to Sweden where he was appointed physician to the king and queen. He practised in Stockholm for a few years before retiring to spend the rest of his life on Capri. There he wrote the entertaining jumble of memoirs, philosophy and commentary on the human scene, remarkable for its humour and irony, its shrewd and subtle valuation of his contemporary world, published in 1929 as *The Story of San Michele*.

Arthur Schnitzler, 1862-1931, practised medicine in Vienna for a few years, but his true occupation was being a Viennese. While still in his twenties he became Austria's most popular playwright. His gift for sharp characterization with the light touch remains unequalled. Though many have tried, and are still trying, no one else has so brilliantly expressed the frivolous charm and gaiety of Franz Joseph's Vienna—as it was according to the legend of it which is now accepted as official. There life consisted mostly of sophisticated love-making, in dialogue which

bubbles like champagne, between naughty ladies and gentlemen in improbable uniforms, played to an obbligato of Johann Strauss and punctuated by popping corks. If Vienna had not existed before, it did so when Schnitzler had finished, and the debt owed him by Hollywood is incalculable.

A biographical note is scarcely necessary about Sir Charles Sherrington, who died recently at the age of ninety. His great work in physiology, with special reference to the function of the nervous system, was justly rewarded by his professorship at Oxford, the Order of Merit, and a Nobel Prize. But it is with surprise that one meets this meticulous scientist as a lyric poet. His one published volume, *The Assaying of Brabantius* and about forty other poems, is work of a high order, both technically and in that indefinable quality which distinguishes poetry from mere verse. It is equally surprising that this remarkable man completed his poems at the age of sixty-five, long past the time of life at which in most poets the lyric impulse has become sclerotic.

William Somerset Maugham, born in 1874 and still writing well at eighty, qualified in medicine at St. Thomas' Hospital and did a year as an extern in the Lambeth slums, but never practised. In 1914 he enlisted as M.O. to an ambulance unit, but soon transferred to Intelligence. He has written a shelf of good novels, successful plays and brilliant short stories. *Of Human Bondage*, *Cakes and Ale* and *The Moon and Sixpence* are his best-known novels. His short story, *Rain*, is a minor classic.

Maugham's divorce from medicine must have been an amicable one, leaving him with pleasant memories, to judge from the many intelligent and respected characters in his stories who are identified as doctors.

Oliver St. John Gogarty, born in 1878, is entirely identified with Dublin, where he was born and practised as a leading surgeon until a few years ago. When he opposed the Sinn Féin uprising in 1921 he was kidnapped and his house burned, and then for the following 12 years he served as senator of the Free State! Ireland's most famous writers have been his lifelong associates. Yeats was his close personal friend; George Russell called him "the wildest wit in Dublin"; James Joyce wrote him into *Ulysses* as Buck Mulligan. But Gogarty was middle-aged before he began to express his wit on paper.

Since then he has written *As I Was Going Down Sackville Street*, *Tumbling in the Hay*, a good deal of verse, and a number of urbane short stories which hide their polish behind a deceptive casualness.

James Joyce himself does not qualify for inclusion in this paper: he gave up the study of medicine after his first lecture, when he found the fees were payable in advance.

Albert Schweitzer, born in Alsace in 1875, held doctorates in divinity and theology when he was

twenty-four. By the age of thirty he was a celebrated theologian, the foremost authority in the world on Bach, the most famous interpreter of that composer on the organ, and a noted organ builder. He then decided, for deeply personal and religious reasons, to spend the rest of his life as a missionary in Africa. To prepare himself for this work he studied medicine for seven years, in his spare time editing five volumes on Bach.

In 1913 he arrived at Lambaréné in French equatorial Africa, an area peculiarly notable for squalor and disease, where he set up a hospital in an abandoned chicken house. For the past forty years he has worked with fabulous energy and effectiveness as physician and surgeon and public health organizer, as teacher and friend and pastor to the natives, as their builder, social guide and economic planner. With no organization supporting him, dependent on voluntary contributions, he now has a 300-bed hospital in a relatively healthy and prosperous community—an achievement which might do credit to a team of experts.

The motive behind this is revealed in the dozen volumes which are the product of his leisure hours. His concerns—man's duty to himself, to his fellows and to his God—are not new, but his brilliantly original mind has given them new force. His best-known volume—so far—is *Philosophy of Civilization*. His Nobel Prize for 1953 may be regarded as not so much timely as overdue.

Francis Brett Young, who died recently at sixty-nine, announced himself a poet when he was five, but deferred his literary ambitions for another thirty years. Meanwhile he took his medical degree from Birmingham and did general practice until 1914, served in the R.A.M.C. in East Africa, was invalided out in 1918, and lived on the island of Capri until 1929.

He had married a singer, and was himself a talented pianist and composer. He often accompanied his wife in public appearances, and for her set to music many of Robert Bridges' poems. On Capri he lived in a house built for him in exchange for translating into English the stories of an Italian architect.

It was at this time that he began to write novels, of which he has about twenty to his credit, as well as some poetry and several plays. His best-known books are *This Little World*, *Portrait of Clare*, and *My Brother Jonathan*.

It would be difficult to reach any detailed conclusions from the material presented. Most of the men discussed started medicine as adolescents and quit as soon as circumstances permitted them to follow their true impulse as writers. Rabelais, Sir Thomas Browne, Locke and Linacre lived while medicine was still a philosophy, and no conflict presented between art and science. Holmes, Bridges, Munthe and Gogarty

had full professional careers before entering into a different period of their lives, and beginning to write to the exclusion of practice. Marat, John Brown, Osler and Drummond were primarily medical men, whose creative writing represents a small portion of their total achievement. Only Thomas Brown, Weir Mitchell and Albert Schweitzer, so unlike in their lives and works, share the accomplishment of having throughout their lives pursued, with distinction in both, parallel careers in medicine and literature.

And finally, to avoid the most blatant possible omission from this summary, mention must be made of the physician who has been more widely read than all others combined. But it must be left to the individual's opinion whether his work was creative writing or straight reporting: this is, of course, the Gospel According to St. Luke.

## GENERAL PRACTICE

### COLLEGE OF GENERAL PRACTICE

#### EDUCATION COMMITTEE\*



THE TERMS of reference of the Education Committee of the College of General Practice are:

1. To evaluate the various types of postgraduate training as to their acceptability for fulfilling the requirements for continued membership in the College and to assess the credits for membership attendance.
2. To conduct, develop or assist in the programmes, lectures, courses, or other means of postgraduate medical education for the benefit of the members and of the profession at large.
3. To encourage and assist medical schools and hospitals in developing and maintaining adequate courses and facilities for the education and training of general practitioners.
4. To encourage medical graduates to enter the field of general practice.

The Committee has now reported on its first two meetings; a summary of the report will be of interest to many readers of the Journal.

The first problem tackled by the Committee was that of assessment of credits for postgraduate training. It was decided that the maximum credit for any course would be hour for hour. It was

\*The Education Committee consists of Dr. E. C. McCoy, chairman; Dr. Howard Black; Dr. J. P. Wellwood; Dr. J. F. McCreary, Head, Department of Paediatrics, University of British Columbia; Dr. J. M. Mather, Head, Department of Public Health, University of British Columbia; and has as advisers Dr. J. Wendell MacLeod, Dean of Medical Sciences, University of Saskatchewan; Dr. R. F. Taylor, Edmonton, Alta.; Dr. W. B. Tufts, Outlook, Sask.; Dr. D. Earl Hunt, St. Catharines, Ont.; Dr. C. L. Gass, Tatamagouche, N.S.; Dr. J. A. MacDonald, Glace Bay, N.S.; Dr. Henry W. Moyse, Summerside, P.E.I.; Dr. Ian Rusted, St. John's, Nfld.



felt that there was a need for standardization of courses on a national basis, since standards vary from province to province. The question of the 50 hours of formal training required was discussed, and it was suggested that the present basis of 25 hours in a formal course and 25 at provincial or Dominion C.M.A. meetings be changed to 40 and 10 hours respectively. The desirability of taking some part of the course outside a practitioner's own area was also stressed.

A list of all courses at present available in each province (and possibly in adjacent states of the U.S.A.) is to be prepared. The possibility of sending travelling teams to rural areas was considered; the development of reading courses for practitioners in isolated areas (perhaps with an examination system) is also to be explored. Members are to be encouraged to read G.P. (the organ of the American Academy of General Practice).

The Committee considered the relation of the general practitioner to the medical school, feeling that the weakness in present training for general practice starts there, because practically all contact of the student is with specialists. In spite of the difficulty of finding a place for the general practitioner in medical undergraduate training, it was thought that preceptorship training should be the backbone of contact with general practitioners, and should be an *obligatory* part of final-year training. It was recommended that the College work through the Dean's Committee to advise on general practice teaching. General practitioners should be represented on Faculty Councils to further the interests of their branch of medicine and see that there was a fair allotment of hours for general practice teaching. The Committee stressed the need for contact of the student with the general practitioner in the working environment of the latter. Exploration of the possible use of general practitioners for teaching in the outpatient and emergency departments of hospitals was recommended.

There was considerable discussion on the type of internship or residency training desirable for general practitioners. The Committee felt that general practice internships should be integrated into teaching hospitals and not be relegated entirely to secondary hospitals. They were of the opinion that the optimum was a three-year internship, and the minimum a two-year internship. The first year should be a general rotating internship of the ordinary type. The second year should be specifically directed to the training of the general practitioner.

The Committee's final preference is for four three-month periods, one in medicine, one in surgery (with emphasis on injuries and emergencies), including two weeks in radiology and two in anaesthesia, one period in obstetrics and gynaecology and one in paediatrics. If a third year could be added, this might consist of half medicine and half surgery, with a possible substi-

tution of obstetrics and gynaecology for surgery.

As regards preceptorships, the point was made that the proportion of rural to urban preceptors should be approximately the same as the proportion of rural practitioners to urban ones in the area concerned. It was also suggested that the custom of undergraduate training in general practice at the end of the academic year, in the months of May and June when practice was comparatively light, should give way to training throughout the year.

With regard to the fourth of their terms of reference, the encouragement of graduates to enter the field of general practice, it was considered that if the suggestions outlined above were followed there would be no need to take up this point at all.

Finally, the Committee expressed in strong terms their dislike of the custom of assigning students to certain families without the supervision of a general practitioner. It was felt that this gave the student a poor slant on general practice and was of little teaching value, and of little profit to the family concerned.

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#### HARVARD AND GENERAL PRACTICE

THE *New England Journal of Medicine*,\* in whose columns there has recently been a discussion on the vanishing general practitioner ("like the Cheshire cat, he recedes and reappears; unlike the outcome of that celebrated animal's periodic fadeouts it is likely that his end stage will be one of increased rather than lessened prominence," says the Editor), notes that the Harvard Medical School has launched a study with a view to integrating the teaching of comprehensive medical care with its school curriculum. Financed by a grant from the Rockefeller Foundation, the study will be developed in and from the Massachusetts General Hospital, and is intended to be a scientific study of the total health needs of individuals as related to families receiving care from the Massachusetts General Hospital. The object of the study is to develop methods for the instruction of medical students in complete medical care, with emphasis on normal child development, early detection and treatment of chronic disease, hereditary and environmental influences on health, and the prevention of disease.

Although this is not directly stated to be aimed at the production of more and better general practitioners, all the subjects mentioned above come right within his orbit, and the general effect should be to orient more medical students towards family practice, and to start more family practitioners off on the right foot.

\*251: 791, 1954.

TELEVISION FOR CANADIAN  
DOCTORS

THE LARGEST closed-circuit television programme ever presented, with more than 15,000 physicians participating in 58 cities in the United States and Canada, will take place February 24th.

In Canada physicians and medical students will gather in five cities—Toronto, Ottawa, Kingston, Montreal and Quebec—to view these private showings.

The hour-long television symposium, originating in C.B.S. television studios in New York City from 6 to 7 p.m. (E.S.T.), will mark the first time a network closed-circuit television programme has been presented in Canada.

The symposium will feature six internationally known medical authorities who will discuss "The Management of Streptococcal Infection and Its Complications." It is sponsored jointly in Canada by the College of General Practice of Canada and John Wyeth and Brother Limited, Walkerville, Ontario, and in the United States by the American Academy of General Practice and Wyeth Laboratories.

The importance of this event in the dissemination of medical information is indicated in separate statements by Dr. M. R. Stalker, President, College of General Practice of Canada, and Dr. William B. Hildebrand, President, American Academy of General Practice.

Dr. Hildebrand, who will act as moderator, has stated, "It is within the realm of possibility that within a few years all of us who are participating in postgraduate medical work will 'go to school' via this new medium. We are truly pioneers in the real meaning of the word. The significance of this television symposium in our postgraduate training programme assumes tremendous proportions when the enormous size of the project is contemplated."

Commenting from the Canadian standpoint, Dr. Stalker said, "The College of General Practice of Canada is interested particularly in continuing medical training for general physicians. It is happy to be associated with this very excellent programme. This is a pioneering effort which may point to a new and valuable technique in medical education."

Those who will deliver scientific papers on the programme are:

Dr. John D. Keith, associate professor of paediatrics at the University of Toronto and physician-in-charge of the Cardiac Clinic and Service of Toronto Sick Children's Hospital. Dr. Keith will speak on "Complications of Streptococcal Infection."

Dr. Burtis B. Breese, assistant professor of paediatrics at the University of Rochester, will discuss "Diagnosis and Treatment of Streptococcal Infection."

Dr. Lowell A. Rantz, associate professor of medicine at Stanford University School of Medicine, will speak on "Epidemiology of Streptococcal Infection."

Dr. Gene H. Stollerman, director of Irvington House, Irvington-on-Hudson, will discuss "Prevention of Rheumatic Fever."

Dr. Keith Hammond of Paoli, Indiana, a member of the Academy, will conduct a question period on "Applications to General Practice."

Dr. Charles H. Rammelkamp, Jr., professor of medicine at Western Reserve University and Director of the Commission on Streptococcal Diseases, Armed Forces Epidemiology Board, will summarize the papers presented and give an outlook on the future of streptococcal infection.

## ABSTRACTS from current literature

## MEDICINE

*Increased Intracranial Pressure Caused by Increased Protein Content in the Cerebrospinal Fluid.*

GARDNER, W. J., SPITLER, D. K. AND WHITTEN, C.: NEW ENGLAND J. MED., 250: 932, 1954.

The authors' thesis is that increased intracranial pressure and communicating hydrocephalus may result from any chronic process that significantly raises the protein content of the cerebrospinal fluid, and that such increased pressure is due to mechanical clogging, by the protein molecules, of the pores of semipermeable membrane of the brain-blood barrier. They describe the case of a woman with bilateral papilloedema of two dioptres and secondary optic atrophy; there were no other significant findings on examination, except for absent ankle reflexes. The spinal fluid pressure was raised to 325 mm. of water, and the total protein content was 425 mgm. per 100 c.c. A cisternal myelogram showed a complete block at the level of the third lumbar vertebra, and at operation an ependymoma was found to fill the area of the third, fourth and fifth lumbar vertebrae. The patient made a satisfactory recovery and at the two-month follow-up examination the optic discs were flat and atrophic.

The authors consider that the raised intracranial pressure resulted from raised protein content of the cerebrospinal fluid which arrived there as a transudate through the imperfect walls of the blood vessels of the ependymoma. The authors describe two further cases. The first was a small acoustic tumour producing communicating hydrocephalus with a protein content of 400 mgm. per 100 c.c. of spinal fluid and pressures varying from 100 to 400 mm.; pneumoencephalograms showed a communicating hydrocephalus of advanced degree. The second case was that of a woman with a Guillain-Barré syndrome with bilateral papilloedema, a spinal fluid pressure of 600 mm. and a total protein content of 470 mgm. per c.c. of spinal fluid; the papilloedema subsided after a subtemporal decompression.

The authors comment on the observations of others that papilloedema may occur in the convalescent stage



of severe poliomyelitis. A survey of the findings of other authors indicates that in the production of papilloedema the chronicity of the process is more significant than the level of the protein concentration. This in turn suggests that the increased pressure is due to the piling up of the protein molecules against the brain-blood barrier rather than the increased osmotic tension of the protein-rich fluid. In the cases of poliomyelitis the papilloedema was discovered earlier, within 11 to 48 days of onset; in this condition, however, there was cellular exudate in addition to protein-rich fluid to clog the barrier. In attempting to produce papilloedema in dogs by repeated cisternal injections of human albumin and globulin, the authors found that the injected protein disappeared from the fluid more rapidly than had been anticipated. In further experiments with dogs the addition of analogous serum protein caused the rate of absorption of Ringer's solution from the subarachnoid space in the test animal to fall to approximately a fourth of the rate in the control.

The authors conclude that a small tumour anywhere along the cerebrospinal axis may cause increased intracranial pressure, papilloedema and communicating hydrocephalus from the escape of serum protein into the spinal fluid through the imperfect walls of the blood vessels of the neoplasm. The process is completely reversible, in contrast with that which occasionally follows a purulent meningitis. W. F. T. TATLOW

*Studies on the Effect of Exercise on Cardiovascular Function. III. Cardiovascular Response to Exercise in Patients with Healed Myocardial Infarction.*

CHAPMAN, C. B. AND FRASER, R. S.: CIRCULATION, 9: 347, 1954.

Patients with healed myocardial infarction, but who are asymptomatic, are, for the most part, able to complete an exercise test involving moderate physical exertion lasting for a minimum of 10 minutes. The response of the cardiac output, mean circulation time, and blood pressure to such an exercise stress is substantially the same, quantitatively and qualitatively, as the response in comparable normal individuals. The relatively marked increase in pulse rate in such patients during the exercise test is probably a manifestation of prolonged physical inactivity rather than of permanent cardiovascular disability.

The exercise test as used in the present studies provides no support for the view that marked restriction of activity is physiologically necessary in patients of this type. S. J. SHANE

*Treatment of Bacterial Endocarditis. Dosage of Penicillin, Use of Other Antibiotics and Treatment of Patients with Negative Blood Cultures.*

FINLAND, M.: CIRCULATION, 9: 292, 1954.

The dosage of penicillin is discussed on the basis of the known properties of that antibiotic and the characteristics of the lesion in patients with bacterial endocarditis. It is the writer's present conviction that aqueous solutions of sodium or potassium penicillin are the dosage forms of choice for the treatment of bacterial endocarditis. In general, daily doses of 1.2 to 3.0 million units (individual doses of 100,000 to 500,000 units) are adequate and probably offer a good margin of safety for the majority of cases, which are due to *S. viridans*. The need for large doses is indicated when the organism is more resistant, when bacteremia is not controlled, or when there is other evidence of persistence of active infection. Under such conditions, the dose should be increased rapidly to about 10 million units per day or more, and serious consideration should be given to the added use of other antibiotics, particularly streptomycin. When

the dose of penicillin required becomes of such magnitude that the size of the individual intramuscular injection is difficult to tolerate, it is best to resort to probenecid in doses of 2.0 gm. daily.

Next to penicillin, streptomycin has probably been used more than any other antibiotic for the treatment of cases of bacterial endocarditis. The results of several investigations would appear to warrant the conclusion that streptomycin is a highly useful agent when used alone for the treatment of infections with organisms that are highly sensitive to that antibiotic; it appears to be particularly useful in combination with penicillin for the treatment of infections due to organisms that are only slightly or moderately sensitive to the latter and to penicillin alone. The dose of streptomycin is usually 2 gm. daily in 2 or 4 equally spaced intramuscular injections. It is usually possible to reduce this to 1 gm. daily after 2 or 3 weeks.

Bacitracin can be recommended as an agent which merits further trials under controlled conditions and in conjunction with penicillin in cases of bacterial endocarditis due to Gram-positive organisms, particularly those which are not highly sensitive to the latter antibiotic alone. Its major drawback is its nephrotoxicity, but when used in intramuscular doses of 100,000 units per day or less, only minor and transient effects on renal function and on the urine findings are noted.

The broad-spectrum antibiotics (oxytetracycline, chlortetracycline and chloramphenicol) should be reserved for patients in whom penicillin alone or in combination with streptomycin or bacitracin has failed; or where such failure might be predicted from the resistance of the organisms to these agents *in vitro*; or when the use of these agents is not possible because of marked hypersensitivity. They may also be used in various combinations with penicillin, streptomycin, or both. At present the use of erythromycin and carbomycin cannot be recommended in the treatment of bacterial endocarditis, unless other measures have failed or *in vitro* tests indicate a high degree of sensitivity of the infecting organism to these antibiotics.

The problem presented by the patient with a clinical diagnosis of bacterial endocarditis but with negative blood cultures is also discussed. Intensive clinical and bacteriological study during a period of about 48 hours, followed by treatment with large doses of penicillin in combination with streptomycin, is suggested for the management of these cases. Less delay is indicated only when the illness is particularly severe and of long standing, or when the patient already shows evidence of cardiac failure or extensive or significant embolic phenomena. S. J. SHANE

*Gitalin in the Treatment of Congestive Heart Failure: A Clinical Study.*

WEISS, A. AND STEIGMANN, F.: AM. J. M. SC., 227: 188, 1954.

Orally administered gitalin was evaluated for initial digitalization and maintenance therapy in 49 cases of more or less severe congestive heart failure of miscellaneous etiology. Digitalization with the drug was tested in 29 patients, and 39 maintenance trials at various dose levels were made in 20 patients. No toxicity developed. The total digitalizing dose ranged from 4.0 mg. to 9.5 mg. and averaged 5.0 mg. The average time required for digitalization was 2.6 days. Studies of individual maintenance requirements of gitalin indicated that approximately 0.5 mg. is the daily dose most likely to be both adequate and nontoxic for the majority of digitalized patients. With accepted methods of estimating the therapeutic ratio of a digitalis preparation, the average therapeutic dose of gitalin was estimated to be well below the average toxic dose. In four patients in whom the digitalizing dosage was cautiously continued until toxicity developed, the ratio of the therapeutic dose

to the toxic dose was 42%. In a group of nine patients on maintenance therapy, deliberate doubling of the minimal therapeutic dose produced toxicity in two (22%); of the remaining seven patients, two developed toxicity when the minimal dose was tripled and five did not manifest toxicity when the dose was raised three to six times above the minimal therapeutic level. Orally administered gitalin is effective for initial digitalization and maintenance of patients with congestive heart failure, and appears to have a wide margin of clinical safety.

S. J. SHANE

*Duration of the Q-T Interval During the Anoxæmia Test.*

ROEHM, D. C., KORY, R. C., MABE, R. E., TOWNES, A. S. AND MENEELY, G. R.: AM. HEART J., 47: 204, 1954.

The Levy anoxæmia test was studied in 40 normal men and 95 male patients with reference to alterations in the duration of electrical systole, as measured by the corrected Q-T interval (Q-Tc). It was found that, even prior to the anoxæmia test, initial Q-Tc durations were significantly higher in patients with anoxæmia than in others. It was also found that, when the actual test was performed, the prolongation of Q-Tc was much greater in patients with angina than the normal subjects and in patients with chest pain of non-cardiac origin. The mean values showed highly significant differences, but the wide range of response among the subjects and the patients was felt to preclude the use of this measurement alone to distinguish between normal and abnormal.

A mathematical formula was developed, indicating that the figure obtained by adding the initial Q-Tc to 2.6 x the maximal increase of Q-Tc during anoxæmia should not be greater than 0.480. The value so determined is termed "Q-T anoxæmia index."

Of 2 observed "false-positive" Levy anoxæmia tests, one case caused by hyperventilation demonstrated an abnormal Q-Tc response. The other case, in which electrocardiographic abnormalities were considered to be the result of a recent pericarditis, had a normal "Q-T anoxæmia index."

These observations suggest that the alteration of Q-Tc duration during the anoxæmia test may be an additional aid in distinguishing a normal from an abnormal response.

S. J. SHANE

## SURGERY

*Pitfalls, Precautions and Complications in Cardiac Resuscitation.*

STEPHENSON, H. E., REID, L. C. AND HINTON, J. W.: A. M. A. ARCH. SURG., 69: 37, 1954.

A study of 1,200 cases of cardiac arrest from many centres led to many interesting findings.

The hand must be on the arrested heart within four minutes if massage is to be successful. Only 6% of the successes followed a delay of over four minutes. There is no time to administer various stimulants, to get a consultant, or even to send for a stethoscope. The only possible person to perform cardiac massage is the one who makes the diagnosis. Since 13% of cases occur outside the operating room, the intern will have the optimum chance in some cases.

The incision should be in the fourth left interspace. The left ventricle should be compressed 60 to 85 times a minute sufficiently to make a palpable pulse peripherally, maintain skin colour and keep the pupils constricted. Success has followed after two to eight hours of massage. Only occasionally is it necessary to open the pericardium, unless to apply electrodes for defibrillation. Although the luxury of sterile precautions can seldom

be afforded in such an emergency, there was a striking absence of infection in these cases following cardiac massage, but penicillin and streptomycin are usually left in the thorax. The operator often suffers abrasions of the dorsum of his hand. Artificial respiration is most important and the operator should notice whether the lungs expand and contract.

An electrical cardiac defibrillator should be standard equipment in any hospital, although 12% of cardiac arrests are associated with fibrillation. Defibrillation was successful in 63%, although the technique is only seven years old. The authors disapprove of most drugs suggested in cardiac arrest. Epinephrine aids myocardial tone, but delay in injection before thoracotomy is unwise. Atropine is of value in prevention rather than in resuscitation. Post-resuscitative care is discussed: artificial respiration, cerebral stimulants, pressure sores, eye protection, anuria, digitalization and medico-legal aspects.

BURNS PLEWES

*Surgical Management of Ulcerative Stasis Disease of the Lower Extremities.*

JULIAN, O. C., DYE, W. S. AND SCHNEEWIND, J.: A. M. A. ARCH. SURG., 68: 757, 1954.

The occurrence of incompetent perforating veins between the superficial and deep circulations in the areas subject to chronic ulceration is considered to be the factor responsible for ulcerative stasis disease of the lower extremities. After the inflammation has been controlled, treatment by saphenous stripping, excision of the involved skin and deep tissue and replacement by split-thickness skin graft is recommended.

The technique of the operation is described and the clinical results of a five-year follow-up are given. To obtain good results the co-operation of the patient is necessary. Daily periods of elevation of the extremity and the wearing of an elastic support are essential.

BURNS PLEWES

## OBSTETRICS AND GYNÆCOLOGY

*Stress Incontinence in Young Nulliparous Women.*

NEMIR, A. AND MIDDLETON, R. P.: AM. J. OBST. AND GYNÆC., 68: 1166, 1954.

A questionnaire on stress incontinence of urine was completed anonymously by 1,327 young, single, nulliparous college women in required health-education classes at the University of Utah. Stress incontinence was present in 695 (52.4%) and was described as frequent by 35 (5%). The chief provocative factor was laughing; excitement ranked second; coughing and sneezing seemed less likely to cause loss of urine. These data are at variance with statements about stress incontinence in current medical literature and therefore deserve publication.

It is concluded that stress incontinence cannot be ascribed solely to child-bearing, since it is very common in healthy, unmarried, nulliparous young women.

ROSS MITCHELL

*Trends in Therapeutic Abortion.*

COLPITTS, R. V.: AM. J. OBST. AND GYNÆC., 68: 988, 1954.

Therapeutic abortion is designed primarily to preserve the life of the mother. It is sometimes difficult to state with reasonable certainty whether allowing pregnancy to run its natural course will result in the death of the mother. Severe and advanced degrees of cardiovascular-renal disease can be judged fairly accurately to jeopardize the mother's life. Statistically, severe cardiac dis-



ease is a real threat to the mother; in certain clinics this disease ranks first as a cause of maternal mortality. Logically, an occasional cardiac patient will need therapeutic abortion. Our most recent means of decreasing the number of therapeutic abortions for this condition rests with the cardiac surgeons.

It is not easy to disregard the mother's right to object to the continuance of a pregnancy which might increase her chances of an earlier death. Certainly the shortening of the expected life span and the value of the child to the family and society must be weighed.

Conditions formerly valid for termination of pregnancy, such as contracted pelvis, pernicious vomiting and avitaminosis, now warrant little attention. Women with pulmonary tuberculosis progress just as well when pregnancy is allowed to continue.

In most psychoses treatment may be carried on during pregnancy without harming mother or baby. The reactive depressions in which the pregnancy itself acts as a definite mental irritant with a tendency to suicide should probably constitute a reason for therapeutic abortion.

Malignancy such as osteogenic sarcoma, Hodgkin's disease and rectal carcinoma; myomas of the uterus with pain, and such neurological diseases as paralysis agitans, epilepsy, multiple sclerosis and Huntingdon's disease are probably not sufficiently detrimental to the health of the pregnant woman to qualify as indications for therapeutic abortion.

Whatever indications we may set up, therapeutic abortion always constitutes a failure of medical science.

ROSS MITCHELL

## PÆDIATRICS

### *Physiological Bowing of Legs in Young Children.*

HOLT, J. F., LATOURETTE, H. B. AND WATSON, E. H.: J. A. M. A., 154: 390, 1954.

The developing child is the centre of adoring eyes. When he starts to walk there is great concern as to the nature of his stance. If the parents detect what seems to be an unnatural one they immediately go to the physician for help. Since an exaggerated bowing of the lower extremities occurs with surprising frequency in apparently healthy, well-nourished infants, this is not a rare problem for the physician. The parents feel that the child has been neglected—that in some way they are at fault. Rickets must be the trouble. Too often the physician feels that a radiograph will settle the problem. Often it just confuses the issue because there is such a wide range of anatomical and physiological variants that occur in the plastic, rapidly mineralizing bones of the growing child. The authors cite their experience with 14 specific cases which they followed at the University of Michigan Hospital, all of which, in the course of events, turned out to have perfectly normal bone structure. They had been sent in diagnosed as having either rickets or osteochondritis deformans. While 14 cases are the only ones reported here (three of these were in children of one of their staff) the authors point out that many other children with similar erroneous diagnoses had passed through the clinic.

In discussing the causes of physiological bowing, the authors point out that from their experience there is evidence of a hereditary factor. However, their conclusion is that this fact is of no greater significance than similar familial tendencies such as protruding ears, a large nose, or prominent supraorbital ridges. The relationship of the bowing to the prenatal bowing of the tubular bones resulting from mechanical pressure of other fetal parts *in utero* is discussed. The decision reached is that these forces may have an indirect bearing. The authors advise the consideration of the numerous examples of spontaneous regression before making a diagnosis, and starting treatment.

ISABEL M. LAUDER

### *Incarcerated and Strangulated Inguinal Hernia in Infants: A Preventable Risk.*

CLATWORTHY, H. W. JR. AND THOMPSON, A. G.: J. A. M. A., 154: 123, 1954.

The authors base their conclusions on their experience with 940 cases in infants under two years of age; 69 of the patients were brought to hospital as emergencies and the rest of the children underwent elective surgery. They report only one death in this latter group, that of a three-month-old, 6 lb. premature with a 48-hour history of intestinal obstruction.

Pleading for elective surgery as good preventive practice, they point out that this defect is one of the commonest abnormalities of infancy with 2% of full-term and 25% of premature infants so afflicted. They definitely vote against truss therapy, saying that there are no known cures from such treatment. Complications in emergency herniorrhaphy are serious and high. These include intestinal obstruction, infarction and atrophy of the testis, and increased incidence of recurrence of the hernia, serious and postoperative intestinal complications, and prolonged and expensive hospitalization.

In the 69 emergency cases, the authors report that major symptoms were irritability, apparent pain and vomiting. The average duration of the strangulation, as judged from the onset of symptoms, was 16 hours. Examination revealed a lump or mass present in the inguinal or scrotal region of each patient (only three of the patients were girls). Abdominal distension, tympany and borborygmi were commonly present. X-ray examination revealed the picture of a high-grade small bowel obstruction. Laboratory findings were of little significance except in the dehydrated and acidotic infant.

The authors also describe their mode of therapy and operative technique.

ISABEL M. LAUDER

## PSYCHIATRY

### *Prognosis of Depression with Electrical Treatment.*

THOMAS, D. L. C.: BRIT. M. J., 2: 950, 1954.

In cases of depression the four questions most frequently asked by patients, their relatives and doctors relate to probable length of stay in hospital, the number of treatments required, the chances of recovery, and the likelihood of recurrence. In the hope of finding more precise answers, the author studied the effects of electrical treatment on 338 patients in the wards of the psychiatric unit attached to St. George's Hospital, London. In addition to electrical treatment, these patients were given psychotherapy, sedation and an occupational programme according to their needs; attention was paid also to social problems arising from their illness. As these factors were invariably present, they do not invalidate the results of electric treatment.

Thirty-one of the 338 patients showed schizophrenic or paranoid features or had a history of manic or hypomanic attacks in addition to depressive illness. The study is therefore primarily concerned with the other 307 patients, 88 men and 219 women. Sixty-nine per cent recovered or were much improved as a result of electrical treatment; 28% were improved; and only 3% were unchanged. Patients with reactive depressions did less well, and less improvement was noted in those with endogenous depressions involving hysterical or obsessional symptoms than in those with other forms of illness. Of those suffering from endogenous depressions without special features, 81% recovered or were much improved. There were similar results in involutional depression, depression with hypochondriasis, and agitated depression.

Patients whose recovery was smooth averaged 5.4 treatments during a hospital stay of from five to six weeks. Those with involutional depression and smooth recovery had an average of six treatments during seven

weeks in hospital. In 26% of all cases recovery was not smooth or sustained. This "relapse" or "interruption of recovery" is of prognostic significance as regards recurrence. Of 228 patients whose progress was followed for 13 months after treatment, 23% showed recurrence. The rate of recurrence was higher in cases of involutional depression, agitated depression, and depression with hypochondriasis. There was no relation between recurrence and degree of recovery achieved by treatment. Of those who "relapsed" while in hospital (that is, needed further treatment after a period of seven days or more without it) 41% showed recurrence within 13 months, as opposed to 16% of those with an uninterrupted recovery.

R.L.R.

## RADIOLOGY

### *Radiation Management of Otherwise Hopeless Thoracic Neoplasms.*

HAAS, L. L., HARVEY, R. A. AND LANGER, S. S.: J. A. M. A., 154: 323, 1954.

In medical use the term "hopeless," as it applies to a cancer can mean either incurability or no possibility of a favourable influence on the patient's condition, even of a palliative nature. In the interpretation of these authors, the term "hopeless" should be reserved for the very few patients whose suffering might be increased or whose death might be speeded by any method of attacking the cancer. In the case of thoracic neoplasm, the term "hopeless" is usually applied when the thoracic neoplasm is inoperable. It is known, however, that some surgically-hopeless patients can be cured by radiation and that, failing a cure, good palliation can be obtained by radiation in excess of that resulting from other known forms of treatment.

The authors consider the following factors in evaluating palliation: (1) the objective local effect, judged by physical examination, measurements, radiographs and biopsy; (2) changes in the clinical symptoms in the direction of improvement; (3) changes in the general condition, as related to weight, strength, or working ability; (4) absolute survival time from start of irradiation; (5) extent of terminal distress. They present a series of cases of otherwise hopeless thoracic neoplasms, treated by both betatron and conventional x-rays. These cases included Pancoast tumours with or without metastases and extensions, bronchogenic carcinomas and oesophageal carcinomas. Their results indicated satisfactory palliation in most cases and actual "cure" in some.

It is stressed that every possible avenue of approach should be explored in order to prolong the lives of such patients in relative comfort, or to render their eventual demise less painful.

S. J. SHANE

### *Roentgen Studies of the Effects on the Small Intestine from Emotional Disturbances.*

FRIEDMAN, J.: AM. J. ROENTGENOL., 72: 367, 1954.

There have been few reports of investigation of the effects of emotional disturbances on the small intestine. In the present article, four case studies are described in which the small intestine of human subjects was examined by barium sulphate administration and radiography before and after production of emotional disturbance in the patient. The author summarizes results as follows:

"Roentgen studies have demonstrated that emotional disturbances produced by the interview technique can immediately alter the small intestinal mucosal pattern from a normal mucosal pattern to one of disordered motor function.

"Reproduction of the presenting symptoms of the patient was not necessarily always present with the change in the small intestinal mucosal pattern.

"The altered small intestinal mucosal pattern is not necessarily a pathological entity but may be a functional variation within normal limits."

S.S.B.G.

## ANÆSTHESIA

### *The Use of Chlorpromazine to Control Postanæsthetic Vomiting.*

ALBERT, S. N. AND COAKLEY, C. S.: ANESTH. AND ANALG., 33: 285, 1954.

The most common complication which the anaesthetist has to treat in the immediate postoperative period is vomiting. Improvement in anaesthetic management has reduced its incidence, but vomiting still remains a problem in the postanæsthetic period. Though numerous drugs have been tried, the best results have been obtained with Dramamine (dimenhydrinate).

The author tried to evaluate the effect of the administration of 50 mgm. of chlorpromazine by mouth before the induction of anaesthesia in lessening or preventing postoperative vomiting. Two series of surgical cases were studied simultaneously, a control series of 250 patients and a series of 360 patients who received chlorpromazine. The series were kept as similar as possible by using the same type of operations, drugs and technique. The incidence of postoperative vomiting was studied in two series of anaesthetic administration, gas (ethylene or nitrous oxide) and ether.

In the series of gas anaesthesia, chlorpromazine reduced the incidence of postoperative vomiting from 28.8% to 13%. In the series in which ether was used the preanaesthetic administration of chlorpromazine reduced the incidence of vomiting from 36.4% to 25%. In all cases the chlorpromazine was given orally two hours preoperatively. The only advantage of chlorpromazine is that a single dose is given by mouth before the administration of the anaesthetic rather than repeated injections both before and after anaesthesia.

F. ARTHUR H. WILKINSON

### *Isoniazid Treatment of Psychiatric Patients.*

LEMERE, F.: A. M. A. ARCH. NEUROL. AND PSYCHIAT., 71: 624, 1954.

Isoniazid has a stimulating effect upon the nervous system, and in high doses produces such toxic effects as hyperreflexia, dizziness, hypotension, convulsions and peripheral neuropathy. Irritability, anxiety, tension, euphoria or depression may result from the drug, but the effects appear to be often associated with the previous personality. Other authors have reported contradictory results from giving the drug to psychiatric patients: the present author treated 63 patients with doses varying from 50 to 100 mgm. three times a day. It was found that the tolerance varied from 100 to 600 mgm. a day, and the author lists the undesirable side-effects produced. After treatment of 33 patients for at least three weeks only 13 showed any beneficial results; the author comments that many of the patients would have improved anyway and that only eight patients thought isoniazid helped them. Of these eight improved patients one had migraine with fatigue, two had a mild chronic retarded type of schizophrenia, two had the fatigue symptom of neurasthenia and three had depression. The author concludes that isoniazid is of limited value, if any, for psychiatric patients: but it occasionally seems to help overcome fatigue, mental sluggishness or depression.

W. F. T. TATLOW



## FORTHCOMING MEETINGS

### CANADA

SECTIONAL MEETINGS, AMERICAN COLLEGE OF SURGEONS, Winnipeg, Manitoba. (Dr. P. H. T. Thorlakson, Chairman.) April 25-26, 1955.

CANADIAN HOSPITAL ASSOCIATION, Biennial Meeting, Ottawa, Ont. (Executive Director: Dr. W. D. Piercey, 280 Bloor Street West, Toronto 5, Ont.) May 9-11, 1955.

COMMONWEALTH MEDICAL CONFERENCE OF THE BRITISH MEDICAL ASSOCIATION, Toronto, Ontario. (Dr. A. D. Kelly, Canadian Medical Association, 244 St. George Street, Toronto 5.) June 14-16, 1955.

BRITISH MEDICAL ASSOCIATION, CANADIAN MEDICAL ASSOCIATION, ONTARIO MEDICAL ASSOCIATION, Conjoint Meeting, Toronto, Ont. (Dr. A. D. Kelly, General Secretary, Canadian Medical Association, 244 St. George Street, Toronto 5, Ont.) June 17-24, 1955. (Scientific Sessions June 20-24.)

CANADIAN ACADEMY OF ALLERGY, Annual Meeting, Royal York Hotel, Toronto, Ont. (Dr. P. A. Ryan, Acting Secretary, 229 St. Clair Avenue West, Toronto 7, Ont.) June 21, 1955.

### UNITED STATES

SECTIONAL MEETINGS, AMERICAN COLLEGE OF SURGEONS, Hotels Cleveland and Hollenden, Cleveland, Ohio. (Dr. Stanley O. Hoerr, Chairman.) February 21-24, 1955.

AMERICAN ORTHOPSYCHIATRIC ASSOCIATION, Annual Meeting, Hotel Sherman, Chicago, Ill. (Marion F. Langer, Ph.D., Executive Secretary, 1790 Broadway, New York 19, N.Y.) February 28 to March 2, 1955.

SECTIONAL MEETINGS, AMERICAN COLLEGE OF SURGEONS, Sheraton-Biltmore Hotel, Providence, Rhode Island. (Dr. Henri E. Gauthier, Chairman.) March 3-5, 1955.

EIGHTH ANNUAL POSTGRADUATE COURSE ON DISEASES OF THE CHEST, Bellevue-Stratford Hotel, Philadelphia, Pa. (Dr. C. L. Jackson, Chairman.) March 7-11, 1955.

INTERNATIONAL SYMPOSIUM ON CARDIOVASCULAR SURGERY, Henry Ford Hospital, Detroit, Michigan. (Dr. Conrad R. Lam, Chairman of Programme Committee, 2799 West Grand Boulevard, Detroit 2, Michigan.) March 17-19, 1955.

AERO MEDICAL ASSOCIATION, Twenty-sixth Annual Meeting, Hotel Statler, Washington, D.C. (Dr. O. O. Benson, Jr., Brigadier General, U.S.A., President.) March 21-23, 1955.

AMERICAN ACADEMY OF GENERAL PRACTICE—7th Annual Scientific Assembly, Los Angeles. (Mr. Mac F. Cahal, Broadway at Thirty-fourth, Kansas City 11, Missouri.) March 28-31, 1955.

SECOND MICROCIRCULATORY CONFERENCE, Philadelphia, Pa. (Dr. G. P. Fulton, Chairman, Boston University, College of Liberal Arts, 725 Commonwealth Avenue, Boston 15, Mass.) April 5, 1955.

AMERICAN DERMATOLOGICAL ASSOCIATION, Belleair, Florida. April 17-21, 1955.

AMERICAN RADIUM SOCIETY, Annual Meeting, Shoreham Hotel, Washington, D.C. (Dr. R. E. Tricke, Secretary, Mayo Clinic, Rochester, Minn.) April 21-23, 1955.

INTER-AMERICAN CONGRESS OF RADIOLOGY, Shoreham Hotel, Washington, D.C. (Dr. E. P. Pendergrass, Secretary-General, 3400 Spruce Street, Philadelphia 4, Pa.) April 24-29, 1955.

AMERICAN COLLEGE OF PHYSICIANS, Philadelphia, Pa. (Mr. E. R. Loveland, Executive Secretary, 4200 Pine Street, Philadelphia 4, Pa.) April 25-29, 1955.

AMERICAN GOITER ASSOCIATION, 1955 MEETING, Skirvin Hotel, Oklahoma City, Oklahoma. (Dr. J. C. McClintock, Secretary.) April 28-30, 1955.

AMERICAN PSYCHOSOMATIC SOCIETY, Annual Meeting, Atlantic City, N.J. May 4-5, 1955.

AMERICAN UROLOGICAL ASSOCIATION, Biltmore Hotel, Los Angeles, California. (Dr. C. H. de T. Shivers, Secretary, 121 S. Illinois Ave., Atlantic City, N.J.) May 16-19, 1955.

AMERICAN MEDICAL ASSOCIATION, 1955 Annual Meeting, Atlantic City, N.J. (Dr. George F. Lull, Secretary, 535 North Dearborn Street, Chicago 10, Ill.) June 6-10, 1955.

### OTHER COUNTRIES

SIXTH LATIN AMERICAN NEURO-SURGICAL CONGRESS AND SECOND LATIN AMERICAN ELECTROENCEPHALOGRAPHICAL CONGRESS, Montevideo, Uruguay. (Dr. R. Arana-Iniguez, Convencion 1287, Montevideo, and Dr. P. Pinto Pupo, San Pablo, Brazil.) March 21-24, 1955.

JAPAN MEDICAL CONGRESS, Kyoto, Japan. (Dr. M. Goto, Secretary General, University Hospital, Medical Faculty of Kyoto University, Kyoto, Japan.) April 1-5, 1955.

TENTH CONGRESS OF THE INTERNATIONAL UROLOGICAL SOCIETY, Athens. (Prof. Z. Kairis, rue Voukourestiou 25, Athens.) April 10-18, 1955.

MIDDLE EAST MEDICAL ASSEMBLY OF THE AMERICAN UNIVERSITY OF BEIRUT, American University campus, Beirut, Lebanon. (Dr. John L. Wilson, Professor of Surgery, Chairman, Committee for the Fifth Middle East Medical Assembly.) April 22-24, 1955.

WORLD HEALTH ORGANIZATION—8th General Assembly, Mexico City. (World Health Organization, Palais des Nations, Geneva, Switzerland.) May 10, 1955.

FIFTEENTH CONGRESS OF FRENCH-SPEAKING PEDIATRICIANS, Marseilles, France. (Dr. René Bernard, Clinique Médicale Infantile, Hôpital de la Conception, Marseilles.) May 23-25, 1955.

INTERNATIONAL COLLEGE OF SURGEONS—20th Anniversary Meeting, Geneva, Switzerland. (Dr. Max Thorek, 850 West Irving Park Road, Chicago 13, Ill.) May 23-26, 1955.

SEVENTH INTERNATIONAL CONGRESS OF COMPARATIVE PATHOLOGY, Lausanne, Switzerland. (Prof. Hauduroy, 19 avenue César-Roux, Lausanne.) May 26-31, 1955.

INTERNATIONAL HOSPITAL CONGRESS, Lucerne, Switzerland. (Capt. J. E. Stone, Hon. Secretary, International Hospital Federation, 10 Old Jewry, London, E.C.2, England.) May 30-June 3, 1955.

EUROPEAN CONGRESS ON RHEUMATISM, Scheveningen, The Hague, Netherlands. (Dr. H. van Swaay, Secretary, Pieter Bothstraat 12, The Hague, Netherlands.) June 13-17, 1955.

FIFTH CONGRESS OF THE INTERNATIONAL ASSOCIATION FOR THE STUDY OF THE BRONCHI, Stockholm, Sweden. (Dr. J. M. Lemoine, 187 boulevard Saint-Germain, Paris 7e.) June 18-19, 1955.

FOURTH COMMONWEALTH HEALTH AND TUBERCULOSIS CONFERENCE, Royal Festival Hall, London, England. (Secretary-General, National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1, England.) June 21-25, 1955.

## NEWS ITEMS

## NEW BRUNSWICK

At the annual meeting in December the Saint John Medical Society elected officers for 1955: President, Dr. Fred Cheesman; Vice-president, Dr. George Keddy; Secretary, Dr. Henrik Tonning.

Dr. George White spoke on "Office Gynaecology" at the November meeting of the Kings County Medical Society at Sussex. Dr. Fred Whitehead discussed the question of indigent patients at the same meeting.

Certification by the Royal College of Physicians and Surgeons of Canada was granted to Dr. J. A. Caskey of Saint John in Radiotherapy; Dr. Norman Skinner of Saint John in Diagnostic Roentgenology; Dr. Thomas Foster in Obstetrics and Gynaecology; and Dr. Henry Watts in Medicine.

Hon. Dr. J. F. McInerney, Minister of Health of New Brunswick, recently announced that the Provincial Government had decided to purchase a cobalt source and installation for the Cancer Control branch. This instrument will be installed in the Radiotherapy Department of the new wing of the Saint John General Hospital.

Dr. A. F. Crook, F.R.C.S., D.M.R.T., of Belfast, Ireland, has been appointed Assistant Radiotherapist at the Saint John General Hospital and will report for duty early in 1955.

Dr. D. F. V. Brunsdon, newly appointed Director of the Fredericton Regional Laboratory, has been certified in Pathology. Dr. Emile Frigault, Radiologist at Bathurst, and Dr. Francois St. Laurent, Radiologist at Campbellton, have been certified in Radiology.

Promotions in Medical Staff of the Saint John General Hospital for 1955 include Dr. F. C. Jennings as Chief of the Anaesthesia Department and Dr. J. K. Sullivan as Chief of the Department of Urology.

Dr. Ora Smith of the N.B. Department of Health has been certified in Psychiatry by the Royal College.

Dr. J. A. Melanson, Chief Medical Officer of the N.B. Department of Health, was chairman of the semi-annual conference of Health Services at Fredericton in December. Hon. Dr. J. F. McInerney was present. Dr. A. F. Chaisson, Director of Communicable Diseases, stated that it was the intention of the Health Department to purchase Salk vaccine from Connaught Laboratories in a manner similar to the other provinces. This vaccine is to be administered to children in specific age groups beginning probably in April, 1955. Dr. R. J. Dolan, Director of Cancer Control, announced that the Minister of Health after consultation with the N.B. Medical Society, had approved more centralized and complete cancer services. Dr. R. R. Prosser, Director of Mental Health, was pleased that the Fredericton Mental Health Clinic was now housed in the Victoria Public Hospital because such a clinic in a general hospital is more readily accepted by the public and brings a closer working relationship between psychiatry and other branches of clinical medicine.

Hon. Dr. J. F. McInerney stated that the Provincial Cabinet has approved the Federal-Provincial agreement providing allowances for permanently and totally disabled residents of New Brunswick.

Dr. James C. Mulligan, until recently practising in Dorchester, N.B., has joined the staff of the Provincial Hospital at Campbellton.

A portrait in oils of the late Dr. H. A. Farris by the Canadian artist Jack Humphrey was unveiled in the main hall of the surgical wing of the Saint John Tuberculosis Hospital on December 28. Dr. Farris watched the building of this hospital and was its superintendent for fifteen years. His work in the treatment of tuberculosis and the education of the public to believe in the curability of this disease was outstanding in a national programme.

A. S. KIRKLAND

## NOVA SCOTIA

A one-day symposium in Geriatrics was held at the Nova Scotian Hotel, Halifax, on December 8. The Lederle Laboratories Division of the American Cyanamid Company in conjunction with the Postgraduate Committee of Dalhousie University were sponsors of the course.

The visiting guest speakers were Dr. E. Lee Strohl, Associate Professor of Surgery, Northwestern University, Chicago; Dr. Richard H. Freyberg, Associate Professor of Clinical Medicine, Cornell University Medical College; Dr. Allan Walters, Assistant Professor of Medicine, University of Toronto; and Dr. Wallace Wilson, Department of Veterans' Affairs, Vancouver.

Dr. Greg. Tompkins of Halifax and Glace Bay has been given an extension of a McEachern fellowship granted a year ago by the Canadian Cancer Society.

Dr. Tompkins has been studying cancer of the female genital tract with Dr. John L. McKelvey of the University of Minnesota. He received his earlier training in obstetrics and gynaecology under the direction of Dr. H. B. Atlee, Dalhousie University.

Dr. Lorne H. Burdett is completing his fourth year of training in Plastic and Reconstruction Surgery, most of which was done at the Straith Clinic of Plastic Surgery, Detroit. Prior to this, he practised at Red Rock, Ontario.

Dr. D. L. Sutherland, who has been with the Neurological Service at Albany Hospital, N.Y., is now on the staff of the Neurological Institute, Montreal.

Dr. T. H. Earle after six years' practice at Upper Stewiacke has moved to his new practice at Middle Musquodoboit.

Dr. Hugh MacKay has been appointed medical supervisor of the new Aberdeen Hospital in New Glasgow. Apart from the time spent in wartime service, in which he administered military hospitals at Halifax, Sydney and Aldershot as well as a medical hospital ship, Dr. MacKay has been a practitioner in his native town of New Glasgow.

On the evening of December 7 a joint dinner meeting was held by the Nova Scotia Society of General Practitioners and the College of General Practice of Canada, Nova Scotia Chapter, at which Dr. W. Victor Johnston, Executive Director, College of General Practice of Canada, was the guest speaker.

Dr. H. B. Atlee, Professor of Obstetrics and Gynaecology at Dalhousie University, took part in a symposium on obstetrical complications encountered at the time of delivery, held in Saskatoon on January 20, 21 and 22.

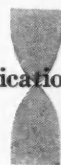
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NEWS OF THE MEDICAL  
SERVICES*Canadian Armed Forces*

Colonel E. J. Young, C.D., returned to Canada on December 4, 1954, from Korea where he was A.D.M.S., 1 Commonwealth Division. Lieut.-Col. A. G. McLaren, Officer Commanding, 3 Canadian Field Ambulance, has been appointed Senior Medical Officer for the Commonwealth Brigade in Korea. Lieut.-Col. A. F. Nancekivell, C.D., Officer Commanding, Canadian Section, British Commonwealth General Hospital, Kure, Japan, has returned to Canada to take up duties at Montreal Military Hospital.

Other medical officers returned as a result of the reduction of the Canadian Army commitment in Korea are as follows: Major D. H. B. Bevan-Jones, Captain J. R. McIver, Captain G. Neilson, Captain V. R. Waldorf, Captain D. Kubryk, Captain G. Babineau, and Captain S. J. O'Rourke.

Wing Commander W. L. Orr, R.C.A.F. Station, Rockcliffe, has received certification in Diagnostic Radiology from the Royal College of Physicians and Surgeons, Canada.

Squadron Leader A. M. Beach, D.F.C., was promoted to the rank of Wing Commander effective January 1, 1955.

book is not easy to read, and this is complicated by his rather diffuse style of writing. This is unfortunate, for with our present plethora of periodical literature there is real need for monographs of this type, which should be concise and designed for easy access to any aspect of the problem. These criticisms apply particularly to the chapters on genetics, where one is left with the unavoidable feeling that the subject has been superficially handled. It is unfortunate also that while it is still undecided whether ambulatory non-weight bearing methods of treatment give as good results as complete bed rest in splints, a standard method of comparison cannot be used. Dr. Goff has continued the tradition that each new study must include a new method of assessment, thus making a comparative analysis most difficult.

The book is well produced, and its illustrations are excellent, especially the reproduction of radiographs. Despite the foregoing criticisms (which reflect the reviewer's personal disappointment), the volume is a monumental contribution and should be placed in every reference library, as well as in the personal collections of interested specialists.

DEMONSTRATIONS OF OPERATIVE  
SURGERY

*A Manual for General Practitioners, Medical Students and Nurses. H. Bailey, Emeritus Surgeon, Royal Northern Hospital, and Consulting General Surgeon, Metropolitan Ear, Nose and Throat Hospital, London. 387 pp. illust. 2nd ed. \$4.10. E. & S. Livingstone Ltd., Edinburgh & London; The Macmillan Company of Canada Ltd., Toronto 2, 1954.*

This short text has all the fine features that we associate with publications by Hamilton Bailey. It is clear, concise and lavishly illustrated. The drawings and photographs deserve special commendation for their clarity and apt selection.

Of the eight sections, the first two are devoted to general considerations, including instruments, sterilization technique and endoscopy while the last six are concerned with regional operative procedures of which only the highlights are given. The general sections have real limitations for Canadian nurses and students in that many of the instruments described are not in common use in this country. In the reviewer's opinion, the latter six sections would be most interesting to the student nurse who would like some fundamental information about common operative procedures. The material is over-simplified for most medical students.

This is a most useful book for the library shelves of nursing and medical schools but probably not one which will find wide use as a prescribed textbook.

## BOOK REVIEWS

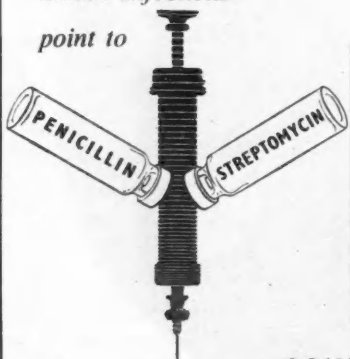
## LEGG-CALVE-PERTHES SYNDROME

*And Related Osteochondroses of Youth. C. W. Goff, Assistant Clinical Professor of Orthopaedic Surgery, Yale University School of Medicine. 332 pp. illust. \$11.75. Charles C Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1954.*

This book will be of interest to any orthopaedic surgeon, particularly one whose practice includes children. The author has attempted to summarize existing knowledge of Legg-Calvé-Perthes disease, and to this has added the conclusions derived from his personal experience at the Newington Home and Hospital for Crippled Children at Farmington, Connecticut. He has succeeded in his purpose, but has included so much detail that the

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### THE FOUNDATIONS OF SURGERY

G. Perkins, Professor of Surgery, London University; Orthopaedic Surgeon, St. Thomas's Hospital. 236 pp. \$1.70. E. & S. Livingstone Ltd., Edinburgh & London; The Macmillan Company of Canada Ltd., Toronto 2, 1954.

As Mr. Perkins points out in his preface, the title of this slim pocket-size volume is intentionally grandiose, so that nobody need be ashamed to be seen reading it. The book should, according to its author, be called "Surgery for Toddlers." It is designed to help the unfortunate student when he is first let loose on the vast field of surgery, and consists of short chapters on the elements of surgery, with great stress laid on methods of examination and on diagnosis. All padding is eliminated, and the author adopts a thoroughly realistic approach to his subject, with occasional tilts at examiners. After a brief description of inguinal hernia he says: "That is all that a doctor needs to know. A surgeon must know more and the medical student more still, because he is expected to know as much as Cunningham did."

The book is fun to read. It has to be dogmatic, and some will quarrel with a few of the assertions made, but this is inevitable in this type of book. To say, for example, that the peritoneum is not in danger in typhoid fever is misleading; to say that Poupart's ligament runs to the symphysis is inaccurate. But these are small matters in comparison with the general usefulness of the book. Those called upon to teach the elements of surgery might take a look at some of the material and pick up useful hints from it.

### CLASSICS IN CLINICAL DERMATOLOGY

W. B. Shelley, Chief, Clinic of Dermatology, University of Pennsylvania Hospital; and J. T. Crissey, Instructor, Dermatology and Syphilology, University of Pennsylvania. 467 pp. illust. \$11.50. Charles C Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1953.

One cannot be brought back too often to original writings. The authors of this book have done well to collect for us so many of the classical descriptions of skin diseases. Short biographical accounts have been added, and often photographs as well, thus completing the historical aspect of the book. A sympathetic and discerning introduction by Professor John H. Stokes emphasizes the value of the clearcut descriptions of those whose work has been selected and their ability to differentiate the various entities. The illustrations taken from the older atlases of dermatology have been splendidly reproduced and remind us of the truly excellent drawings which preceded modern photographic methods. The book has all the instruction and interest of a well arranged selection from classical sources.

### THE CHILD, HIS PARENTS, AND THE PHYSICIAN

H. F. Shirley, Professor of Paediatrics and Psychiatry; Director of the Child Psychiatry Unit, Stanford University School of Medicine, San Francisco, California. 158 pp. illust. \$4.25. Charles C Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1954.

The majority of medical students and young physicians know little about child behaviour except for its nuisance value. If they are to counsel parents wisely, they will require some understanding of the emotional needs and development of children. Dr. Shirley's book is intended to give them that understanding. The views put forward are sensible and nicely presented. Intelligent parents would also gain from reading this monograph.

### AN INTRODUCTION TO PHYSICAL METHODS OF TREATMENT IN PSYCHIATRY

W. Sargent, Physician in charge of the Dept. of Psychological Medicine and Lecturer in the Medical School, St. Thomas's Hospital, London; and E. Slater, Physician in Psychological Medicine, National Hospital, Queen Square; Hon. Physician, Maudsley Hospital, London. 351 pp. illust. 3rd ed. \$3.40. E. & S. Livingstone Ltd., Edinburgh & London; The Macmillan Company of Canada Ltd., Toronto 2, 1954.

This is the third edition of a book first published in 1944. It is a standard elementary book on somatic methods, and as such it is a good book, practical and direct. For the advanced student however, it is inadequate. The section on electrotherapy is particularly out of date. Some of the terms used, e.g. "fits," "electric-shock box," are unnecessarily crude and not conducive to sympathetic reception from the critical reader. In spite of a number of other shortcomings, this book can nevertheless be recommended as an introduction to somatic treatment methods. We need more published material in this field, because the market is flooded out of all proportion with so many poor and misleading books emphasizing the "purely" psychological.

### RECENT DEVELOPMENTS IN PSYCHOSOMATIC MEDICINE

Edited by E. D. Wittkower, Associate Professor of Psychiatry, McGill University, and R. A. Cleghorn, Associate Professor of Psychiatry, McGill University. 495 pp. illust. \$10.00. J. B. Lippincott Company, Montreal, 1954.

This book is intended to present some of the newer developments in the field of psychosomatic medicine. In itself it is not designed to replace some of the older and larger volumes but it encompasses most of their contents, with particular emphasis upon some of the more recent concepts.

The volume is made up of composite writings by authorities in the various fields of medicine. It includes chapters of general interest as well as chapters with some detail on specific topics such as psychosomatic medicine in relation to thyroid disease, ulcerative colitis, cardiovascular disease, obstetrical and gynaecological problems, and skin diseases. The section on endocrine disturbances is particularly good. The text is written in an interesting manner and, aside from being informative, can be recommended because of the relative simplicity with which the material is presented. The book will also serve as a useful guide to some of the related therapeutic measures.

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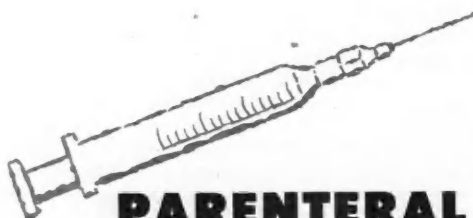
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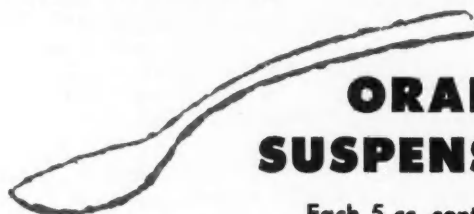


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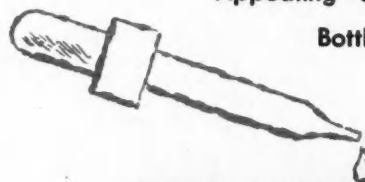
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